COMPUTERWORLD

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'Suspected Companies' on Crime Commission Lists

By P.L. Carney
Special to Computerworld

On Nov. 6, 1969, the Chicago Crime Commission stated in its "Spotlight on Legitimate Businesses and the Hoods," "We recognize the right of a person to choose his associates, but when a business opens its doors to the public, it must accept the corollary right of the public to know with whom it is doing business.

"When a business open to the public is owned or operated by known members of the crime syndicate, keeps among its officers, directors, and employees persons who have a direct relationship with the syndicate, or countenances open meetings of hoodlums on its premises, then we believe that the consumer is entitled to know these facts."

The Spotlight then names 72 businesses in the immediate Chicago area which are owned or directed by known syndicate-affiliated persons.

These businesses include the expected restaurants, bars, and nightclubs, but, surprisingly enough, also include

Spotlight on Mafia DP

automobile sales agencies, insurance agencies, insurance companies, finance companies, construction firms, and building maintenance firms.

While none of the 72 named are known to have a computer, seven – just a fraction less than 10% – are known to use service bureaus.

While these are the known syndicate-affiliated companies – based upon the records of the corporate directory of the Illinois secretary of state which lists the officers of the corporations whose names are then matched against arrest and conviction records – there are those companies known to the crime commission and the police departments of cities around the country as "suspected of being affiliated/infiltrated by syndicate-connected persons."

Corporate records do not indicate ownership or directorship by syndicate members, but officers and executives of those companies have been known to, "at times," associate with known criminals.

In the Chicago area alone, two of those "suspected companies" have computers. One has an IBM 1401, the other a 360/30 system.

It's reported that in the New Jersey area there are two CDC computers which allegedly were in the hands of the

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Year-End Review Issue

This is *Computerworld*'s special combined year-end review issue dated Dec. 30 and Jan. 6. The next issue will be dated Jan. 13 and should reach subscribers Jan. 11.

The Year-End Supplement: Review and Forecast follows Page 10a of this combined issue and includes the Top 10 stories of 1970, articles on the computer users' adolescence, the concern for social issues, a hardware software and communications review, and an analysis and projection on the "Decade of the User."

Year of Crisis

Cutbacks Hurt Most

By Edward J. Bride
CW Staff Writer

The year of the C's: cutbacks, computer announcements, consumerism, crises. The year has come and gone, leaving computer users and other segments of society in a recession, but with a bevy of new computers to help stimulate the economy for the coming year.

Financial cutbacks had the major influence on the computer community last year, as users were forced to postpone equipment acquisition, software development, and even feasibility studies.

Corporate structures, where many of the DP centers are slotted, were the first targets.

Travel, expansion, and conference exhibit budgets were slashed. Few were untouched, and there is no really positive indication that 1971 will break from the present plateau.

Some users cut back on their staff, and manufacturers cut back on production workers because of decreased backlogs.

All the major manufacturers had major announcements, resulting in the biggest hardware year since 1965. "Keeping salesmen busy" was offered as a secondary motive for the announcements, and the new computers are expected to provide much-needed sales activity.

Some users and consultants are calling the current breed the "next" (fourth?) generation. The makers more modestly refer to their new products as "evolutionary" rather than "revolutionary" and all manufacturers emphasized, in one way or

(Continued on Page 4)

Radar Wipes Out IRS Tapes; Consultant Cites Poor Ground

By Edward J. Bride
CW Staff Writer

NASHVILLE, Tenn. – Several, perhaps hundreds of Internal Revenue Service computer tapes containing thousands of tax records were erased by airport radar last spring, and some of the data has not been restored yet.

The then brand-new computer center here is "within a couple hundred yards" of a radar installation, according to a tax official, and a consultant has revealed that inadequate grounding of metal shielding was the cause of the wipeout.

Information is still sketchy at best, since IRS officials contacted by CW would not discuss the matter, other than denying knowledge of its occurrence and promising to "look into it."

But the consultant who assisted the tax agency in revealing the problem said the IRS reticence was due to the fact that there were no duplicate files on some of the 1969 returns involved.

The consultant, Henry Hoffart, also stated "hard copy" original returns and documentation from previous years had been put onto computer tapes for comparisons, and that this information, too, was lost.

Hoffart is director of electromagnetic compatibility research for Topaz Electronics, of San Diego, but was a consulting engineer for General Electric when the tax record wipeout occurred.

'Spurious Energy'

He said that if the center had had effective grounding, the "spurious energy" from the airport radar would not have affected the computer tapes.

Another consultant told CW that computer centers in "high ambient areas," those near radio transmitters, for example, could experience similar difficulties, especially without adequately grounded shielding.

Hoffart criticized grounding regulations of the Army Corps of Engineers, which permit aluminum conductors for grounding. Low-conductivity aluminum allows more "noise" on a circuit, he claimed.

The Army Engineers also require only one ground for computer center, according to Hoffart, and this ground is at the entrance of the power to the building.

Hoffart noted that at the Austin, Texas, IRS center, the computer is removed by about 500 feet of cable from the ground, the processor is "sitting up in the air," making the computer a transmitter at certain wave lengths.

He said such a construction could make the computer a receiver, too.

He said inadequate shielding, or ineffective grounding of proper shielding, can compromise the security of data being processed, and receiving equipment could eavesdrop on police information or other sensitive messages.

Canada Builds Debtor Data Bank

By a CW Staff Writer

TORONTO, Ont. – A debtor's data bank is being assembled under the auspices of the provincial Department of Justice and, when completed in three years, it will provide information to anyone who wants it, for $2 per search.

Government officials said there had been some objection to the system, but attributed problems to "misunderstanding" of the essence of the data bank. A spokesman for the Ontario Government said there would be no "credit" information in the data bank, which will be restricted to the following three items:

- Sales contracts of $300 or more.
- Chattel mortgages (using belongings, rather than property as collateral).
- The assignment of book debts by companies.

Most automobile loans will be included in the data bank, under the second category.

Forty-eight county and district files will be converted onto the Personal Property Security Registration System, which will keep track of about 800,000 loans, or $2.4 billion annually.

Under the system, a person seeking information will be assigned an account number with the government, and will use the account number in calling the Justice Department. A preliminary figure of $2 per lookup has been set, and the person holding the account number would be billed after the searches have been implemented.

The government claims it will "discourage" inquiries which are obviously "frivolous," but did not offer any definition of security precautions against the "nosy neighbor."An official did indicate the computer system would be set up to "discourage" such inquiries.

The law authorizing the data bank provides for legal judgment and damages to be awarded if a creditor should fail to have a settled debt removed from the data bank.

There are no provisions for a debtor to challenge any information, however, and he must pay the $2, just like anyone else, if he wants to see his file, a government official stated.

When a searcher calls the data center, he gives his account number, and the operator will "call up" the file of the subject on a CRT terminal, and read off the information to the caller.

Information on individuals will be restricted to the name of the lien holder(s), and not the balance, original amount, or the expiration date of a debt.

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Big Computer Users Expand Activities Faster Than Small Users, Survey Says

NEW YORK – Big computer users are expanding their DP activities faster than small DP users, according to a survey made by market researcher Daniel Yankelovich, Inc.

Conducted for Leasco Systems Corp., the Yankelovich survey divided users into four classes according to size of the senior computer in the system. The four classes were: (1) 360/20 or equivalent, (2) 360/25 or 30, (3) 360/40 or 50, and (4) 360/65 or 67.

Fifty three percent of DP managers for Group 4 users said they expected their budgets to increase more than 25% in the next five years, compared to only 35% in Group 2 and 42% in Group 1.

The study also showed that about one-fourth of the DP managers didn't expect their budgets to increase at all. This percentage remained fairly constant in all the size categories.

To arrive at these conclusions the Yankelovich group interviewed executives and DP managers at 286 companies, which the pollsters say are representative of 60% of the nation's computer installations.

There are differences in how tasks are assigned to the DP department as well. In 40% of the Group 4 companies line managers or non-data processing executives select new applications for computerization.

In the smaller companies, on the other hand, the financial officer, DP manager, or a top executive picks the applications; actual users of the computer system do not participate in the decision.

Size group (360/) / Expected Increase	1	2	3	4
	20	25, 30	40, 50	65, 67
Over 50%	25%	15%	19%	22%
25%-50%	17%	20%	43%	31%
10%-25%	28%	31%	16%	22%
Less than 10%	6%	7%	1%	0
No Increase	24%	27%	21%	25%

DP Managers' Budget Increase Expectations in the Next Five Years

Six out of seven (86%) of the largest users bought outside consulting services in the year preceding the survey, while only three out of five (60%) of the smaller installations did. The larger users also tend to use non-manufacturer outside services, according to the report.

The pollsters asked if the users had a documented plan for expansion of DP activities for the next two to three years, and found that only 35% of the Group 1 companies did, while 54% of Group 2, 75% of Group 3, and 77% of Group 4 firms had such plans.

Larger users run their machines more intensively, the report showed. While 90% of the largest firms run 11 or more shifts a week, 85% of the smallest users run 10 shifts or less per week, and 65% of all users run 10 shifts or less.

In terms of budget, 93% of the small Group 1 firms have annual budgets of $400,000 or less, while 84% of the largest installations have budgets of $750,000 or more. Of all firms surveyed, 65% have annual budgets of less than $400,000.

Of the 286 companies interviewed, 36% were of the smallest size, 47% were in Group 2, 16% in Group 3, and 2% in Group 4.

Yankelovich was acquired by Leasco in 1969, and since then has done DP studies only for the parent company. Before that it had done market research for IBM.

Fourth Software Patent Expected to Be Granted

TEANECK, N.J. – A fourth software patent is reportedly in the making, according to local programmer George Forsythe.

A "Method for Debugging Computer Programs" was devised by Forsythe, who was informed by the U.S. Patent Office that his application will be granted.

Forsythe's method is based on a software program which monitors test sessions of application programs and, in effect, automates many of the conventional console debugging techniques. Under the Forsythe approach, test sessions can continue past a variety of errors, identifying each for later evaluation.

Forsythe said that he has demonstrated the method on an IBM 1410. In one test, 12 out of 13 errors in an application program were found in a single test shot. Further, Forsythe said, the debugging program issued error messages which eliminated most of the programmer's analysis time.

Printing of patents normally takes from six to 12 weeks, but when it is finally issued, it will apparently carry the date of Dec. 29, 1970.

A similar patent was granted earlier for a "debugging aid" called Autoflow, which creates flowcharts of users' software.

'Suspected Companies' on Police Lists

(Continued from Page 1)

syndicate there, and they were so well known they were nicknamed "the Mafia machines." The location of the installation was "unknown," and, supposedly, the machines are no longer in service.

A spokesman for CDC denied any such report.

Delivered to Truck

The premise that computers have been "delivered to a truck" by most of the manufacturers of CPUs has been explained by the manufacturers as "deliveries to the government for secret installations." While that explanation could be true, the manufacturers could also only think it is true.

An IBM spokesman stated that he did not believe that his equipment could be in the hands of the Mafia. He did not explain why it could not.

Logically, then, it can be assumed that if the Mafia has need of a system, their own, a "friend's" or a legitimate service bureau's or time-sharer's (without the latter's knowledge, of course), the system would be available to them.

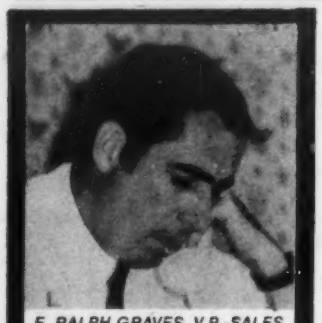
"The storage of information," one police source said, "would be important to them [the Mafia], but even more important would be the transmission of information.

Transmission of information by EDP media has a two-fold purpose to the higher-ups of the Mafia.

Not only do they not want their arch-enemies, the FBI, privy to their inner thoughts and plans, they may not want some of their own people in on what's happening.

There are new laws on wiretapping, new leniency in searches, new interpretations on witnesses' immunity in testifying.

These new weapons of the anti-crime forces are going to make the paperless, less accessible, speechless storage and transmission of information by EDP all the more valuable to organized crime in this country.



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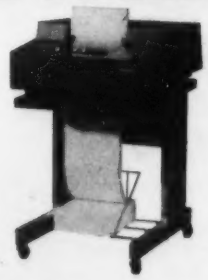

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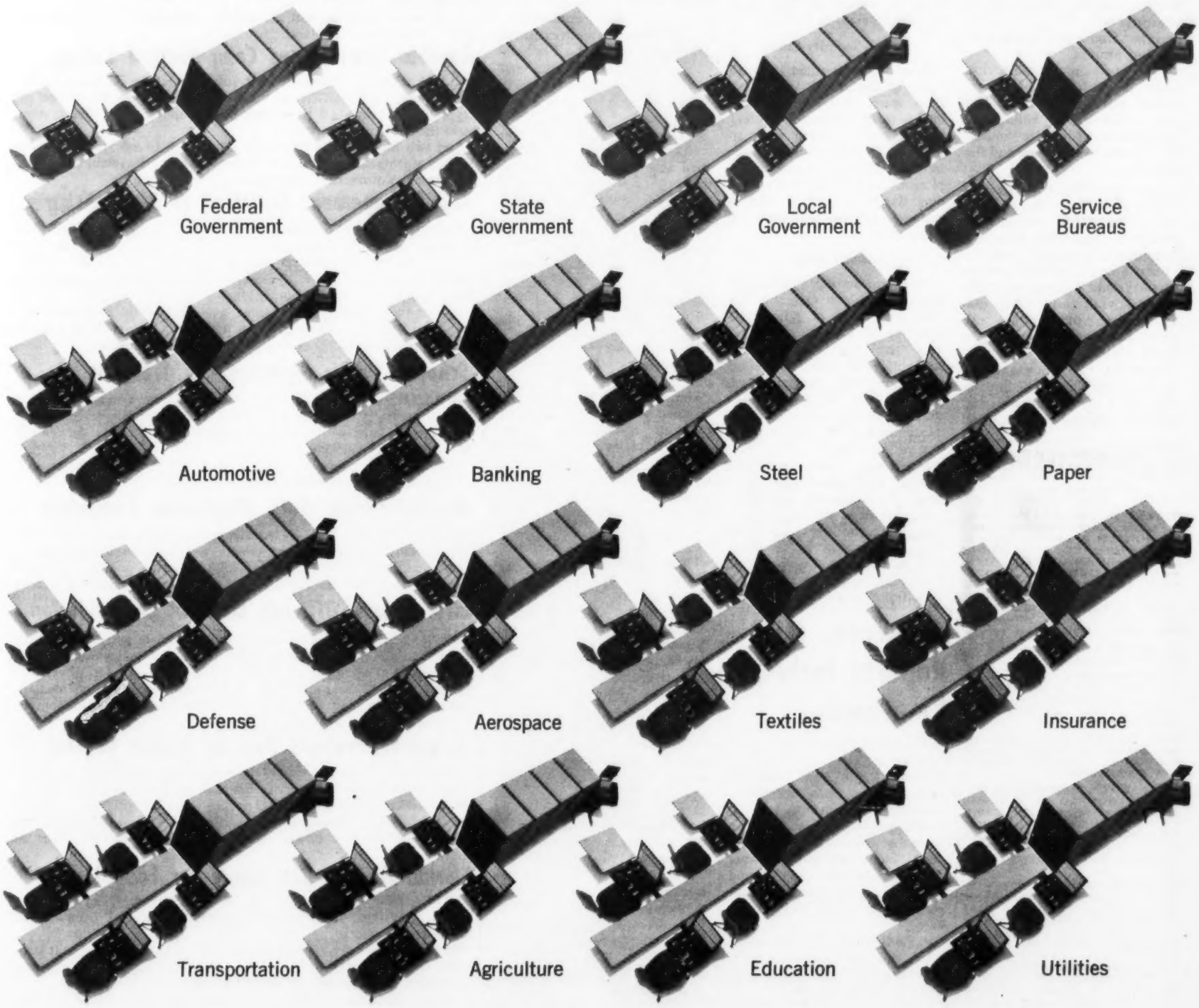

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Financial Cutbacks Had Major Influence

(Continued from Page 1)

another, their "commitment to our users."

Voice of Future?

A potentially significant voice emerged in society in 1970: the consumer. It started in the spring, when the President's top consumer aide, Mrs. Virginia Knauer, criticized the "wall of computers" which removes people from the complaint-handling process.

The cause of consumerism cooled down, however. Congress placed aside measures dealing with computerized billing and credit bureaus for more "important" issues like the war and the recession.

Consumer advocates pledged to continue the fight, and one particular brand of consumer did emerge as a powerful voice: the computer user as a customer.

Users brought vendors to court when systems did not work, the largest lawsuit being a $70 million breach of contract suit against Burroughs by Trans World Airlines.

In another case, for example, a court awarded $85,000 in damages to a service bureau who claimed customer contract violations damaged the service bureau's business.

Although that award is under appeal, these cases served to point out a prime area of concern for all computer users: the inadequacy of many computer contracts. Lawyers continue to caution that legal expertise must be used in such complicated areas as contracting for computer equipment or services.

Power, Security Crises

Many observers called 1970 the "year of the crisis," and indeed there were more bombings and invasions of computer centers, than in 1969. There were attempted firebombings, and the more destructive dynamite explosions such as the early morning destruction of a research complex at the University of Wisconsin.

Power Failures

There was another problem DP managers had to face; the distinct possibility of power failures, or at least "brownouts" and the resulting random scrambling of data. There are indications that fuel shortages will continue to make this a year-round danger.

Communications entered the "crisis" picture, too, as a man was brought to court after being charged with long-distance theft from a time-sharing operation.

The big news for communications users, however, was a preliminary decision by the FCC, indicating the commission favored independent carriers for data transmission. Observers are predicting that in 1971 microwave transmission facilities will begin to proliferate, removing some of the load from the already burdened back of AT&T.

'Social Conscience'

With all the crises of the transition year, the establishment seemed to be exhibiting a "social conscience." After conservation groups made themselves heard, politicians up to the President became concerned for the environment and contributions made by computers centered in sophisticated analysis.

Within the computer community, responsible spokesman cried out for computer professionals to educate the public as to the capabilities and limitations of computers.

With the social conscience becoming apparent in the establishment, however, there appeared to be a lessening of this issue among radical groups. Social implications sessions at both joint computer conferences were quiet discussion periods, sparsely attended, and relatively nonproductive.

The "legal crises" for IBM lessened somewhat, as three out of four commercial antitrust plaintiffs settled their suits out of court. Only Control Data Corp. and the U.S. Government remain in antitrust litigation against the giant.

Fourth Software Patent?

Three software patents were issued, and a fourth was reportedly pending at year's end.

Problems with computerized voting increased in 1970, with Detroit making news when the city experienced difficulties in both the summer primaries and the November "real thing."

Los Angeles, which had run into earlier difficulties, seemed well-prepared, and had a successful computerized election but at a higher cost than originally anticipated.

Detroit sued the punched-card-vote vendor, and the case will probably not be settled until mid- or late-1971.

The issues of consumerism, contract protection, and communications will also continue to be prominent in the new year, but financial experts do not agree on whether the recession and its all-enveloping cutbacks are past or present.

Software, Mini Reports Included By Auerbach

PHILADELPHIA – Two new reference services, *Auerbach Software Reports* and *Minicomputer Reports*, have been prepared by Auerbach Info, Inc.

Software Reports package reports that contain pricing, operational characteristics, hardware requirements and support and training facilities for significant packages currently being marketed.

Minicomputer Reports covers minicomputer characteristics necessary to "mix and match" them to the user's needs.

News Wrapup

Programmers, Union Still at Odds

LONDON – Twenty-two Rolls-Royce programmers continue to refuse to join Clerical and Administrative Workers' Union (Cawu) and have declined an opportunity to put their case before a union-management tribunal.

Cawu seeks to uphold an agreement made with the company which gives the union 100% membership rights at the Parkside engines plant.

If the men refuse to join the union, management is expected to remove them from the plant.

Another Town Drops Computerized Voting

MINNEAPOLIS – Computerized voting is taking its blows again.

According to an article in the *Minneapolis Star*, the village of Plymouth has dropped the Votomatic computerized voting system after the September primary.

And two Bloomington city councilmen plan to ask the Minnesota Voting Machine Commission to approve a new DP system to replace the present Votomatic arrangement.

Top Management Criticized at DP Meeting

LONDON – At a conference of the British Computer Society the audience of senior management and DP personnel was told that present difficulties between top management and its DP departments must be overcome if users of computers are to progress to more ambitious types of applications.

Men at the top of the companies, speakers told the audience, were criticized, and not surprisingly, for not taking a more direct interest in application plannings as well as general policy guidance.

Schools, Public Agencies Eye T/S Plan

DULUTH, Minn. – Bids were opened at the Duluth Board of Education on a sophisticated computer that might be used on a time-sharing basis with other school districts and public agencies in Northeastern Minnesota.

Whether the committee recommends it will depend on the amount of time-shared income that can be contracted.

Medical Center Gets Minuteman Computers

BATON ROUGE, La. – Two digital computers designed to guide Minuteman missiles to their targets will soon be utilized at the Louisiana State University Medical Center to analyze electrical responses recorded from injured and regenerated peripherals nerves.

City, County Officials Mull DP Consolidation

SPOKANE, Wash. – City and county officials said recently that consolidation of computer services is feasible and would provide more efficient service at a reduced cost to taxpayers. The director of central services for the county said major problems that must be worked out include finding an adequate location and incompatability of the two computer programs.

Irrigation Projects Due for Better Control

SPOKANE, Wash. – Computers are programming their way into irrigation projects. A research project in the developmental stages in Idaho uses computers to predict proper water quantity for crops.

According to a Department of Agriculture official the project will be turned over to a private firm from which farmers may rent the service.

Florida Drivers Get Ready for Long Lines

TALLAHASSEE – As part of a major overhaul of Florida's licensing system, computerized central issuance of licenses was begun last summer.

Now the state's drivers will receive notice, by computer, that they must be reexamined for licenses. Only notification of drivers is computerized, as is final issuance of licenses.

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DP Proves Useful Tool in Search for Medicaid Abuses

STOCKTON, Calif. – "The only way we can work our way out of our administrative problems is by the use of a computer," said Dr. Donald C. Harrington, medical director of the San Joaquin County Foundation for Medical Care.

Harrington and other California doctors have been testifying before the House Ways and Means and Senate Finance Committees on abuses involved in Medicare and Medicaid. Statistics have indicated that overcharging or overtreatment by some doctors, dentists and pharmacists have helped push Medicare and Medicaid costs far above original estimates.

The county medical care foundation, made up of local physicians with the help of the county medical society, gets federal-state funds to cover monthly insurance premiums for coverage of the poor.

With the help of an IBM 360/40, medical profiles on about 44,000 people in San Joaquin County are run, as well as profiles on "providers" of service – physicians, dentists and pharmacists.

This latter includes a rundown on the type of services each provider has given in the past year to give a picture of his typical type of rendered service. Every three months a file of all providers is produced and a comparison is made between each one and the norm of the community.

Although Harrington feels that abuses in the program are relatively small, he says that the only way to pick these abusers out is by the use of a computer.

"We are making extensive use of it," he said. "The numbers of people who abuse are small, but the harm that they produce on both patients and on dollars is tremendous. Because the numbers are small, it takes a computer to find them."

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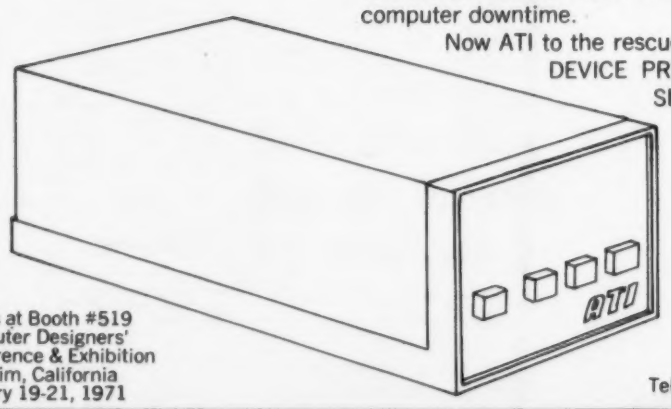

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Data Speeded For Car Design

CW European Bureau

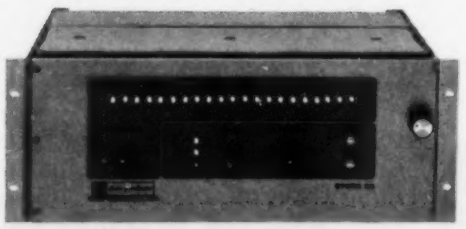
STOCKHOLM, Sweden – A new computer information system which supplies design data to the company's staff of designers has recently been installed by Volvo, a Swedish automobile manufacturer.

The system can also supply data for material planning and production, as well as being capable of linkage with other systems for use in other applications, the company said.

Marines to Study Program Automation

FULLERTON, Calif. – In Phase II of the Marine Tactical Command and Control System (MTACCS) Hughes Aircraft Co. will design a test bed facility at Camp Pendleton for the Marine Corps to determine the extent of automation necessary for an electronic air and ground command and control system for amphibious landing forces in the post-1975 era.

A Control Data 3300 system will be used as the central computer of the test bed.



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Computer-Based System Ascertains Educational Shortcomings of Deaf Pupils

ROCHESTER, N.Y. – Deaf students are learning secondary mathematics here with the aid of a computer which is also being used to diagnose their educational shortcomings.

According to R.W.W. Taylor, "This is the first time computers have been used diagnostically in education on such a large scale."

Sponsored by the National Technical Institute for the Deaf, the program, Mathematics Diagnostic System, uses an IBM 1500 instructional system and 32 terminals to ascertain student deficiences in precollege mathematics and provide remedial instruction in subjects ranging from arithmatic to analytic geometry.

"As the deaf student enters the program, he immediately interacts with the computer. The computer asks pertinent questions, and based on the responses of the student, is then able to evaluate exactly those areas that the student has not learned. Once the diagnosis is made, the computer can then proceed – at the pace required for each individual student – to present the necessary information to teach the concept," Taylor explained.

"Throughout the process, additional diagnostic tests are given to the student to determine his level of proficiency on each conceptual task," he added. "The MDS program is particularly beneficial for deaf students, because the computer has infinite patience."

Looking to the future of diagnostic computer applications in education, Taylor said: "Although the Mathematics Diagnostic System offers a great deal to the deaf student, the program need not be limited only to handicapped students.

Unusual Map Used In Court

CHICAGO – A legal researcher has submitted a computer-drawn map into an action before Chief Judge William J. Campbell in U.S. District Court here.

The researcher, Sherman H. Skolnick, won a federal suit last year which forced the present court-ordered remapping.

Charging that the map presented by the Chicago City Council had many "fingers" and "hooks" from ward to ward in order to pick up favored precincts or ethnic areas, Skolnick said the council's map has nothing whatever to do with mathematical precision.

Skolnick's map, prepared by a DP consultant, is based upon a median population for each ward with preliminary census tract figures.

He claimed, mathematically speaking, that his map would eliminate the threat of political pressure or political exile for a given ward based upon geography or ethnic population figures.

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Much of the software for the new PDP-8/e is 9000 computers old

It was 1962. John Glenn became the first U.S. astronaut to orbit the earth. *West Side Story* won an Oscar as best picture of the year. Hemlines reached almost to the knee and were still rising.

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Editorial

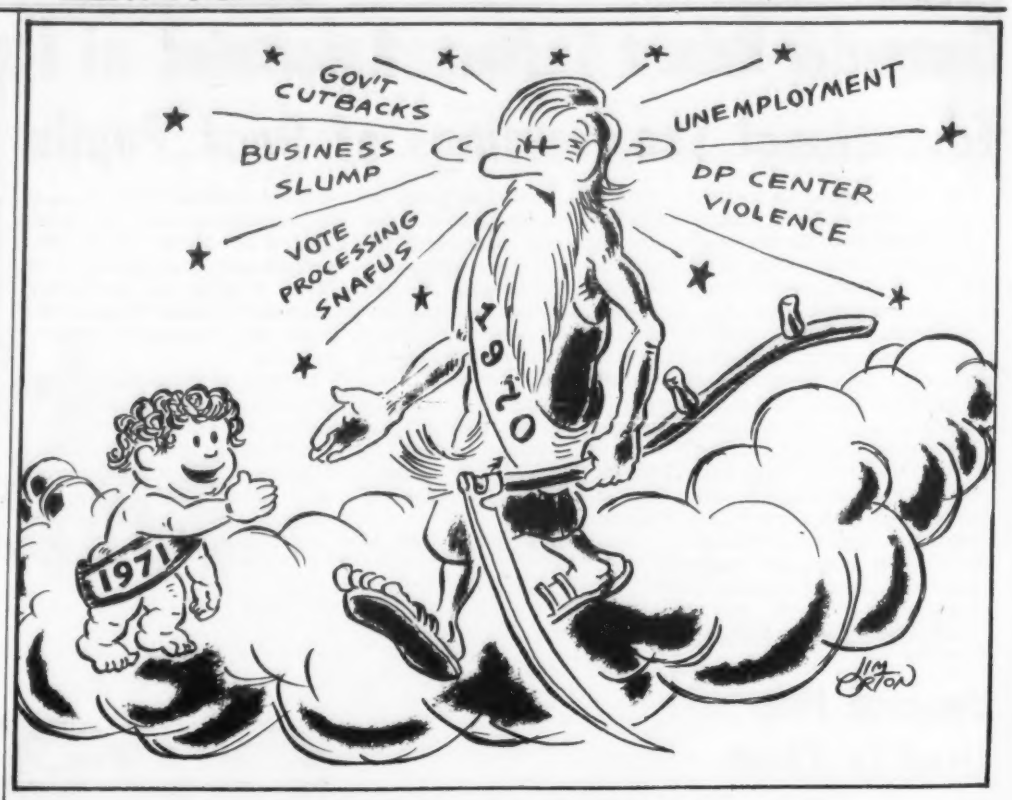
Any Lessons Learned?

The big question of 1971 is: Did we really learn anything from the events of 1970?

Elsewhere in this issue CW has reviewed some of the most significant happenings of 1970.

We don't ask you to agree with our choices, but we do urge you to reflect carefully on what these events may mean to you now and in the future.

The job you save may be your own.



'Don't Worry, Pop - I Can Handle It'

Economic Reality May Have Matured DP Industry

WASHINGTON, D.C. – It was not a very good year.

For the computer industry, as well as for much of the nation, 1970 will go into history as an economic disaster.

D.C. Data-Line
By
Alan Drattell

The year started off well enough, but somewhat into March EDP people began to feel the pinch. The optimism that marked the dawning of the decade of the '70s in January began to wear a bit thin – especially with Wall Street taking a more critical look at investing in companies that had little more than a product and a promise to offer.

By the Spring Joint in Atlantic City, the gloom had settled heavily over the East and West Coasts. By June it had engulfed the Midwest.

The economic debacle of 1970 had to be the biggest story in the industry, dwarfing the surprise merger of Honeywell and computer components of General Electric into a new company to challenge the leadership of IBM.

The fallouts in various segments of the EDP business – software, time-sharing, leasing, service bureaus, etc. – all hit at once.

At first, many of the people affected were discounted as "the dead-wood"; later, many good people became victims – some, unfortunately, were lost through career changes to the industry forever.

It can be said that 1970 was to the computer industry what the first pair of long pants at one time was to a young man – a sign indicating that maturity has been reached.

To this observer, it looks as if the computer industry will emerge stronger from its brush with economic reality. We've left the age of innocence.

And so, with only a glance back at 1970 for historic perspective, we eagerly look toward 1971.

The Nixon Administration promises that it will be a better one economically, and many indicators, including the volatile stock market, portend happier days ahead.

Many computer people are wondering what will be happening within the Federal Government that will affect EDP fortunes. Clues can be found in a speech given by Rep. Jack Brooks (D-Texas) at the Fall Joint Computer Conference in Houston in November.

". . .On a day-by-day basis it is the Federal Government as the largest computer user that will continue to have the most significant impact on the computer industry," Brooks said.

"Computer management and particularly computer procurement is an area of primary impact. For a number of years the computer market in so far as the cost is concerned has been artificially influenced by the predominance of IBM and the antitrust consent decree that came about in the late 1950s.

"In the absence of this decree, IBM could, if the corporation chose to do so, imperil the existence of its smaller competitors through drastic price reduction. To a very great extent the nation's computer industry operates under a price umbrella making it impossible for the government or for users generally to obtain truly competitive prices on computer equipment.

"Somehow (and I am not certain of the solution) we must discard this umbrella and bring true price competition to the marketplace.

"The government," Brooks continued, "is working toward a system of procurement based upon all-out cost vs quality competition. Our goal is to develop performance specifications for computers and peripheral equipment allowing the government to satisfy its computer needs by procurement of computer capacity rather than equipment of some specific manufacturer

"The impact of this policy on the computer industry will be that those vendors desiring to compete for government business will ultimately have to compete directly with IBM on a no-holds barred cost competition basis," Brooks concluded.

Brooks is expected to hold those long anticipated hearings in 1971. The thrust of the testimony may center on interaction between government activities and industry. Development of interface standards should get a big play, and the government may well find itself in the position of attempting to do something about the problem, since industry has apparently let the ball drop.

Sen. Sam Ervin (D-N.C.) is also expected to hold hearings on computerized data banks and invasion of privacy.

The antitrust suit filed in January 1969 by the Justice Department against IBM may be resolved. Its outcome could depend in part on what happens to independent suits against IBM by Control Data Corp. and others.

The elevation of Dr. Ruth Davis to the post of director of the Center for Computer Sciences and Technology at the National Bureau of Standards plus the new position of associate director of standards on her team indicate that the government will be paying greater attention to the enforcement of standards.

There is no doubt that the government will continue to expand its present computer inventory of 5,277 at a slower pace, and that it will remain committed to a rental, rather than a purchase, posture.

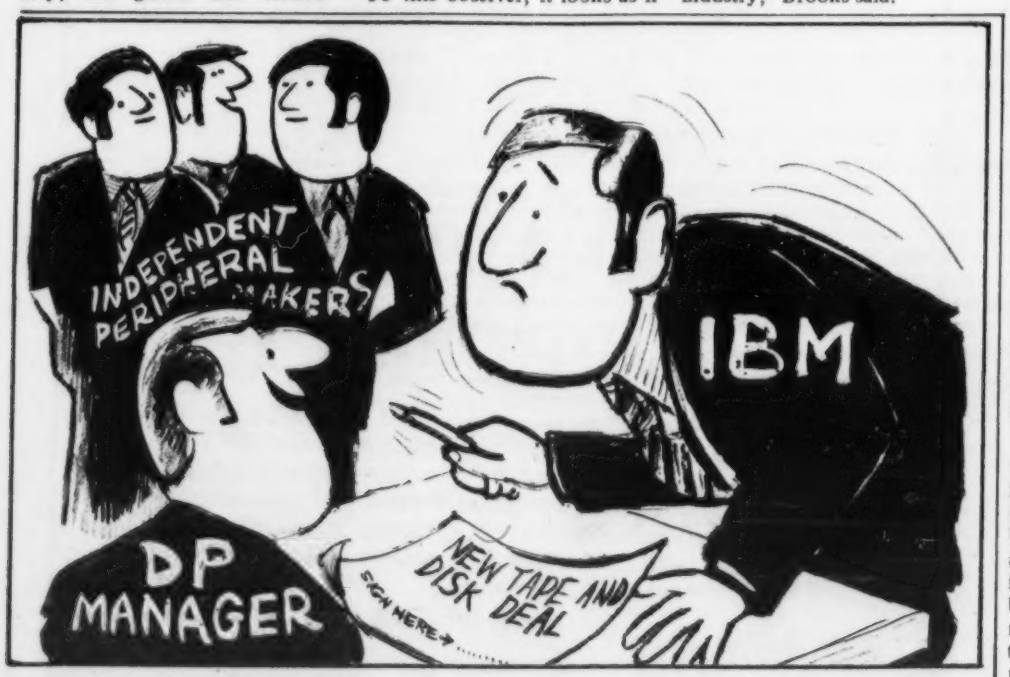
Overall, it looks as if computer buys will be kept to a minimum in 1971 as the government makes do with what it has. Right now many of its system 360s, for example, are being run in emulation mode, and some government people ask what is the need for new equipment.

A key to getting new gear would be availability of machines that offer further enhancement of microprogramming and throughput far in excess of what emulation and simulation normally provide.

In 1971, the Federal Communications Commission is also expected to make major data transmission decision, with users greatly benefitting.

A significant factor in whatever the government does regarding utilizing data processing will be the Nixon budget for fiscal 1972.

This will be a highly politically oriented budget, since its effect on the nation's economy may well determine the President's fortunes in 1972.

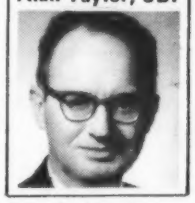


'Wait a Minute, Let's See What They Have to Say'

Model 50 and 65 Questions

Is 140% the Minimum for the Isam Overhead Time?

The Taylor Report
By
Alan Taylor, CDP



In the earlier Taylor Report on the Model 40 Question [CW, The Taylor Report, Dec. 16] the input/output work involved in reading or writing a single record was worked out. This showed that for hardware reasons, (including memory limitation) indexed accessing of a record involved a search over a restricted area of the disks, a read with a maximum record length, an average access time, and a record reading on a separate spindle.

This comes out to one restricted access, +1 random access, +2 half rotational periods, +2 maximum record lengths. Expressed in rotational periods it comes to three rotational latencies + 1 average and one restricted seeks.

Applying this to the Model 50 Question, on 2314 drives, the rotational period is 25 msec, but the average access drops down to 60 msec – faster than the 2314. The restricted access (used for obtaining the index) continues at approximately 30 msec.

The total time involved in obtaining a position, and reading or writing need then only be a total of 165 msec per access (3 X 25 + 60 + 90). To handle the 1,308 words referenced in the first $64 Model 50 Questions takes no more than 1,308 by 165 msec or 3 minutes, 25 seconds.

Processing Allowance

In addition to the purely input/output time a certain amount of processing time may be involved which cannot be overlapped. This would amount to the time subsequent to the obtaining of the index, and before the sending out of the seek instruction for the appropriate record position.

A reasonable allowance on a Model 50 for this would be about 1/2 msec per item or an additional 658 msec for the entire run. Count one second, that makes up to 3 minutes 26 seconds.

A final possible time that might be involved reasonably would be on the checking of the writing. The IBM 2314A does not provide for the genuine write check. Instead it provides a cyclic check which will allow an error made in the recording to be noted when rereading is attempted.

A reasonable systems analyst might object to this and say that for reconstruction purposes it would be much better to catch the error at the time of writing. This would involve a new repeated cycle to read the item back.

In practice it is to be hoped that this will be overlapped, but potentially it might not be. Assuming that overlap is not used, this checking would add another 1,308 rotational latencies each of 25 msec, or a total of 32.7 seconds.

The total time is the sum of these times, or nearly 4 minutes.

As the actual run took 1 hour 9 minutes, the overhead is (69-4) ÷ 4 or approximately 16 times greater than the amount of work actually done. Put into percentages it comes to 1,600%!

2d Model 50 Question

The second part of the Model 50 question involves a more complex operation of 400 transactions. This transaction updated File A, and added a file to Record File B.

In the previous example we only estimated the time involved in reading or writing. Here updating is involved, and this needs an additional 25 msec at least per transaction (or 50 msec if the system uses a total read-back). Allowing 50 msec, the time involved in a reading consists of the operation of these two rotational periods to the previously developed three rotational periods + one average and one random access.

The total for an update is then five rotational periods + 1 average access, + 1 restricted access. All told, for updating File A and for placing a record on File B the time comes to eight rotational periods + 2 average seeks + 2 restricted seeks.

On a 2314A this amounts to 8 X 25 + 2 X 60 + 2 X 30 msec, giving a total of 380 msec/transaction.

Again, processing time is needed between the two index tracks and the actual data record accesses, so an additional millisecond can be reasonably allowed on the 360/50 for this giving a total of 381 msec/transaction.

Missed Cycles

Further, if full track records are used, and if the updating takes longer than the time between the end of the read-down to the beginning of the write-up there may be a further 25 msec delay involved here.

Assuming there is (which is something which would not be assumed without proof in an actual circumstance) an allowable time of 406 msec/transaction is possible.

Applying this for the 400 transactions, this gives 163 seconds, or 2 minutes 43 seconds. The recorded time for the run was 16 minutes, giving an overhead of (16-3) ÷3 or four times longer than the actual production time! The percentage overhead time here is therefore around 433%.

The Model 65 Question

On the final question the Model 65 required five files updated per transaction.

From its simplest point, the same formula per update can be used for each file, – that is five rotational latencies + 1 average and one restricted access. From the statement of the problem the length of the longer movement of the arms can be reduced because the maximum file is only 150 cylinders, so giving a movement averaging only 75 cylinders. This takes around 52 msec.

The time involved in the update will therefore be 25 rotational periods, + 5 average accesses + 5 restricted accesses, which amounts to 1,150 msec/transaction (25 X 25 + 5 X 75 + 5 X 30).

If seek overlapping is assumed because the files are often on different spindles and is estimated to equal 50% of the access times this time would be reduced by 1/2 an average access, or 15 msec, for each file to be updated. This would be 45 msec reduction per file, or 225 msec altogether per transaction, which would then cost 1,150 - 225 or 925 msec.

The range of overlap therefore lies somewhere between 925 msec and 1,150 msec depending upon the amount of overlap. As there are altogether 500 transactions, between 463 and 558 seconds can be allowed for input/output operations. An additional 15 seconds maximum can be allowed for central processing (as this was measured). The total theoretical time then ranges between 478 and 573 msec/transaction or between 8 minutes and 10 minutes altogether.

The recorded time was 24 minutes so that the overhead was between 14 minutes and 16 minutes, or, expressed in percentages, ranged between 140% up to 200%.

What did your analysts tell you about your overhead? Were they right? Or were they so complex that you did not understand them? In any case they should be able to tell you now. Why not get their answers written down, and then just think what they mean to your company?

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The $64 Model 50 Question

A user of an IBM 360/50 with 2314A drives and operating under the full Operating System processed 1,308 new records from tape onto an 85-cylinder newly reorganized file (File A) with eight cylinders of independent overflow. The time involved was 1 hour, 9 minutes.

The tape had been previously sorted so that the records were presented sequentially in descending order so as to minimize the time involved. The record size was 450 characters, blocked five and with three blocks to a 2314 track.

At the same Model 50 installation, after the records were added, the resulting file, and a second file, File B, were processed for 400 transactions. The second file consisted of 63 cylinders of 150-byte records, with the records blocked 14, and again 3 blocks to a 2314 track. The processing consisted of going sequentially against File A, and updating it; then adding a record to File B randomly. Files A and B were held on different spindles.

The time involved totalled 1 hour, 25 minutes, with the adding of records to File A taking 1 hour, 9 minutes and the processing of the 400 transaction taking 16 minutes.

The $64 Model 65 Question

A user of an IBM 360/65 with 2314A drives had five Isam files – A, B, C, D, & E – spread over four spindles, with each file taking between 30 and 150 cylinders. All had been newly reorganized.

Five hundred transactions were processed at the highest priority then in use (12) to update each file.

The file arrangements were: A, record size 314, blocked 5; File B and C both record sizes 106, blocked 6; File D record size 21 blocked 9; and File E, record size 34, blocked 6.

The time for the job was 24 minutes, with 15 seconds of CPU time reported utilized.

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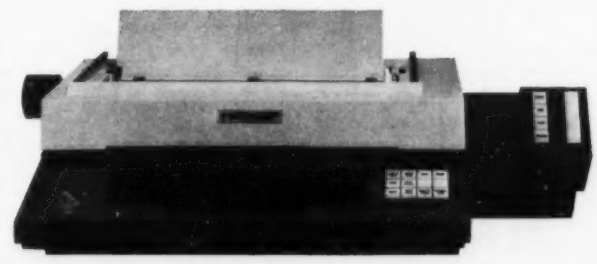

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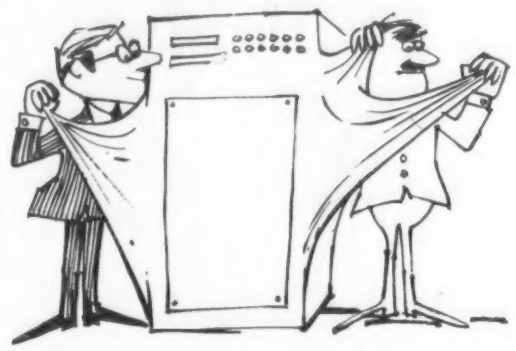

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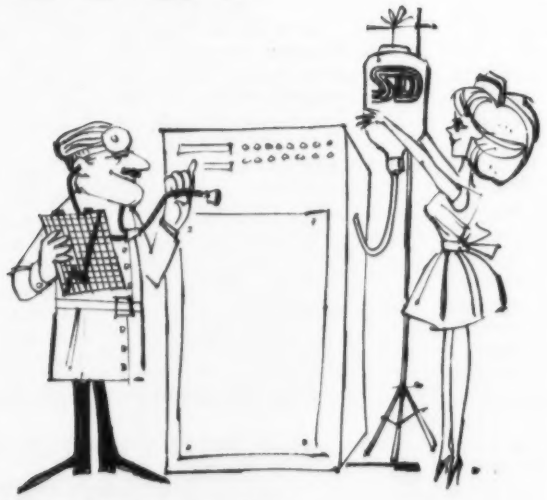

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COMPUTERWORLD

Year-End Supplement: Review and Forecast

December 30, 1970 – January 6, 1971

Computer 'Adolescence' Difficult In Recession, But Users Mature

By E. Drake Lundell Jr.
CW Computer Industry Editor

● *1970, when DP people learned the ins and outs of unemployment insurance instead of stock options and bonus plans.*

● *1970, when DP centers became a target for corporate "bean counters" instead of an ever-expanding activity.*

● *1970, when most users learned the hard way they could do the same – or more – work for less money.*

That was the year that was.

Users were forced to cut back on spending, sparking a recession in the "recession-proof" computer industry in 1970.

1970 seems to represent the year that the computer user "came of age" or reached adolescence, experiencing the traumatic and emotional ups and downs much like human adolescence.

During previous recessions, the computer installation was either too young or too misunderstood by corporate management to come under the knife when budget cuts were being planned.

Drain on Resources

In addition, the computer installation has never been as large a drain on company resources as now.

It is a sign of growing maturity that the computer installations were singled out for budget slashes along with the other departments in many large firms during this recession. Even so, the cuts hurt.

Two CW surveys in 1970 [CW Jan. 14, Sept 30], showed that DP budgets were holding steady among the top corporations in the Fortune 500.

On an average, these firms showed an increase in budget of around 10%, which was barely enough to keep up with inflation, much less hire new personnel or install new equipment.

In addition, informal conversations with smaller users showed them to be even more strongly hit by the recession, largely because they did not have the large financial reserves of the major firms.

The first and most prominent sign of the recession was the unemployment among programmers and systems analysts – and the concomitant reduction in salary levels.

Employment agencies across the nation reported little demand for new programmers and systems people, and those jobs that did open carried lower salaries than before.

Honeywell's Institute for Information Science reported that it was taking twice as long to place graduates (four to eight weeks now) than a year earlier, and that the average salaries had tumbled from about $10,000 down to $7,000.

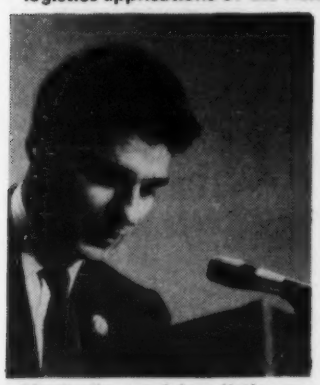
But while unemployment was up – especially in areas with concentrations of defense business – it was not universally bleak, and was probably less than the 4% national average for skilled personnel. It was still a new experience for computer people.

(Continued on S/Page 2)

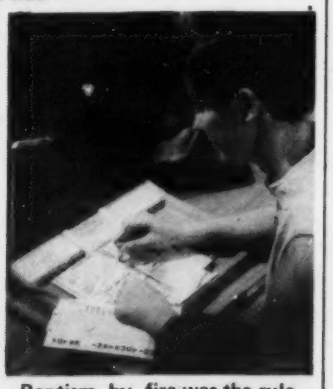
Newsmakers

From bombings to invasions, computer centers remained the symbol of the establishment, and security became a prerequisite to DP expertise.

Computers continued to play a major role in both weapons and logistics applications of the Asian war.



Much discussed but little accomplished in the consumer area. ACM tried to lead the way, attaining the services of comsumer crusader Ralph Nader to deliver keynote address at September convention.



Baptism by fire was the rule for computerized punched-card voting. Detroit showed how badly a foul-up could affect the system, and eventually certified an election before one candidate knew whether he had won or lost.

'Top 10' Feature Issues, Trends

This transition year launched computer users into a decade of new equipment and new opportunity, hopefully leaving behind the problems of the sixties: recession and power and security crises.

The opportunity for correcting environmental troubles presents a significant challenge for the DP community, which experienced a slowdown in social issues last year, attributed by some to the general economic picture.

Appropriate for a transition year, "issues" and "trends" comprised most of the "Top 10" list, with specific instances mostly as signs of these trends, not causes of them. Here then, as seen by the CW editorial staff, are the top 10 occurrences of 1970:

1. Recession hits computer community.
2. New computers unveiled.
3. "Hot" issues outpace consumerism.
4. User contracts seem inadequate.
5. Weather, power, security crises.
6. "Independent DP Carriers": FCC
7. Establishment shows social concern.
8. IBM settles with 3; other suitors plod.
9. Three software patents issued.
10. Controversy surrounds computer vote.

DP Jargon Expanded In Crisis Year 1970

By Thomas J. Morton
CW Midwest Bureau

Arson. Bombing. Invasion. Power shortage. Terrorists. Theft. Water and wind. Wiretapping.

These are new words of the spoken and written data processing language added in 1970 – the DP "year of the crisis."

The year started out filled with promise last January. The industry was still enjoying a faster growth than the GNP, and the air was full of rumors: bright new technology for the bright new decade.

Things looked great through Spring Joint, except for April's unsuccessful invasion ("ransom" they called it) by Black Panther sympathizers at New York University's computer center.

The year of the crisis began in earnest when three firebombs crashed through a window in Fresno, Calif., in mid-May.

Mexican-American and black students, protesting the decision of an administrator of Fresno State College that eight out of 12 ethnic studies faculty members not be rehired, threw three gasoline bombs through the computer center windows.

The DPMA conference opened in Seattle, and while tighter budgets dimmed its brilliance somewhat, DP managers were faced with the spectre of a "dimming" of a greater significance. The hot weather of summer and air-conditioners around the country threatened to drain off the power needed for CPUs.

Most centers got a reprieve. Long hot spells were rare, and the few that came were followed by relieving cool. It wasn't until September that the heat "turned on" and the power "cooled off."

The Northeast suffered the most, but, with only a few exceptions, centers managed to skim in under power drain and function efficiently.

Reality of Larceny

While he was still worrying about the heat, the DP manager faced the reality of larceny. In Chicago, *Encyclopedia Britannica* found out that a mailing list on tape was not only unsafe to keep a valuable list but also an outright invitation for theft for the DP-knowledgeable criminal.

In a lawsuit that still isn't resolved, *Britannica* is attempting to recoup the losses it incurred when some former employees started to sell the list even to *Britannica's* competition that they had allegedly copied on *Britannica's* own equipment and on *Britannica's* time.

In July, welfare recipients in Boston invaded the Welfare Department's computer center protesting that the center was withholding their checks.

Also in July, the FBI arrested a Cincinnati employee of a time-sharing company for allegedly

(Continued on S/Page 3)

Establishment Exhibited Concern in Social Issues

Self-preservation may have been the motive, but 1970 seemed a year when the "establishment" began to show some concern about social issues.

Though little was accomplished in the area of ecology, data banks or privacy, responsible persons finally began to speak out, and to be heard.

The President's concern over the environment led to the revelation that computer paper waste could be recycled, thus saving trees and avoiding pollution-causing disposal methods.

Disclosures of computerized data banks, especially Army intelligence on lawful civilian political activity, brought about the legal destruction of most of these files by the Army.

The issue continues as a source for concern, but with national committees of legislators and scientists studying the problem, it appears that the massive "National Data Bank" will not be authorized hastily.

The area for concern, however, extends to the possible *de facto* creation of such a bank by connecting Internal Revenue, FBI, local police, credit bureau, and educational files.

Late in the year, it was announced that the FBI would be authorized to create the computerized national criminal history, or "rap sheet" file. This

(Continued on S/Page 4)

New Hardware Compatibility Heads Software News

By Don Leavitt
CW Staff Writer

Surprises for the software user were not dramatic or unpleasant in 1970, and overall the year probably has to be considered very satisfying.

Almost as widespread as announcements of new hardware were companion announcements that operating systems and application programs already developed for older equipment would work on the newly announced systems.

"Evolutionary" was the word and the mainframe manufacturers were obviously working hard to avoid fears of another traumatic software changeover, such as the one they forced on the users in the mid-'60s.

Minicomputers were made more attractive to the end-user in two distinct areas. Largely as a result of improved software support, the small machines began to lose their scientific orientation and to become effective tools for business data processing.

At the same time, other software packages brought the minis into teleprocessing networks with mainframe central processors.

While application packages continued to be developed for full-sized computers as well as minis, the independent software houses also showed that they could produce fundamental, and often sophisticated, system software.

In some cases this support offered alternatives to the manufacturer's bundled software; in other cases, it provided new capabilities the user had been unable to get from the manufacturer.

Finally the time-sharing networks that survived were often better equipped to serve the user's needs than they were at the beginning of the year. The user with an in-house CPU often found he could get best results by going to a network for special work.

Several time-sharing organizations expanded so that they became true national networks and, with these, the user having multiple locations could access a common data base.

Nets apparently became more aware of the user's desire to solve problems rather than to write programs: application programs were made available and featured as much as the programming languages.

Along with the application packages, especially those that were business oriented, the networks began to provide a choice of batch or interactive processing modes, often mixed at the user's option.

Small reports could be printed on the relatively slow teletypewriter terminal; high-volume output could be directed to high-speed printers either at the user's site or at the network's.

Other networks saw the need to let the user examine his data and extract reports on an as-needed basis rather than necessarily within the confines of an application. Information retrieval capabilities became important to the time-sharers in these situations.

DP Managers Economize In Peripherals, Software

(Continued from Page S/1)

The DP center managers also found themselves without the large equipment-purchasing budgets they had in the past – and not nearly as large as they wanted.

What Did This Teach Us?

In some installations this caused cutbacks in operations, but others learned how to shave costs and cut corners.

One major way that users found to keep costs in line with the new realities was through the purchase of independent plug-to-plug compatible peripheral equipment from non-mainframe firms.

For years independents have been telling users of savings available by using their lower cost units (typically 10% to 25%), but it took reduced budgets to get many of the DP installations to try the products.

But 1970 was the year for the "independents," as more and more users, led by the federal and state governments, turned to them as a means for reducing costs, with generally good results.

It is too early to evaluate the effect of IBM's new disk drive, tantamount to a price cut, on this aspect of purchasing.

Users didn't seem to turn to the independent software industry in quite as large numbers as with peripherals. The reduced budgets probably caused this, as users wanted to keep all programmers on the payroll busy and often could not afford the cash outlay.

By replacing an IBM tape drive with an independent unit, the user could sometimes see immediate cost benefits, but replacing programs that were free from IBM two years ago with a software package just called for additional outlays.

As the effects of the now 18-month-old unbundling proceed, however, users are expected to take the independent approach in this area, too.

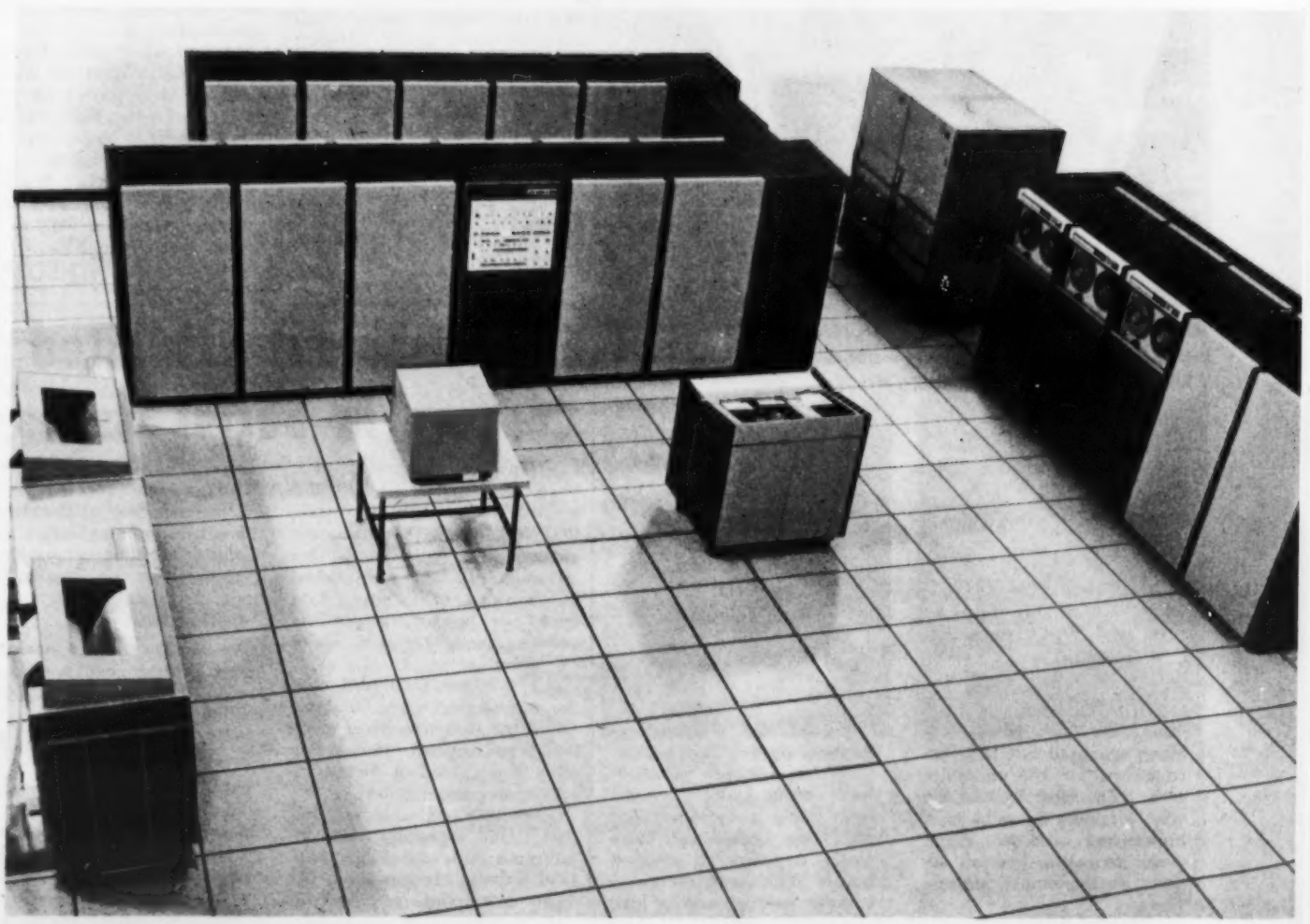
So the tight money times have forced most users to re-evaluate their relationships with the mainframe companies – and many found that they could get along without being over-dependent on the manufacturer.

By being forced to get along on less, many users discovered cheaper – and sometimes better – ways of doing the same jobs and they found that they could successfully cut the apron strings tying them to the mainframe manufacturers.

Users have been forced through their adolescence and are now entering their manhood, where they will act more independently and more resourcefully without the traditional manufacturer ties.

XEROX PRESE

How you see it.



Suitors Settled Serenely

MINNEAPOLIS – Three lawsuits against IBM were quietly dropped by the plaintiffs in 1970, leaving only Control Data Corp. and the U.S. Government in antitrust litigation against the industry giant.

Applied Data Research and its subsidiary, Programmatics Inc., were the first to settle out of court, with ADR receiving $1.4 million in exchange for some "limited" overseas marketing rights to its patented "Autoflow" package.

Programmatics had sued separately, before being acquired by the Princeton, N.J., software house.

With half the commercial plaintiffs dropping out of litigation in August, IBM turned its negotiators to Data Processing Financial and General, which announced its settlement around Labor Day.

DPF&G said that a refinancing of a debt to IBM, plus "substantial" costs of about $500,000 provided the enticements. The leasing company had sought to break up IBM into four separate corporations, for sales, maintenance, leasing and software.

A 1969 breach of contract suit by Greyhound Computer Corp. was transferred here for joint discovery proceedings with the CDC suit, but little progress was reported on this front.

IBM denied all charges in the $5 billion breach of contract suit filed late in 1969 by little Motor Replacement Co. of Pheonix, but here, too, the discovery procedures were slow.

State Bans Punched Card Voting as City Sues Vendor; Even Weather a Problem

The confusion surrounding computerized voting grew to crisis proportions in 1970, as the much-discussed issue became a reality in Detroit.

Experts and politicians tried to explain a mysterious extra hole the crept into a test deck of cards in the primary elections, and another hole in the actual ballots in November. At year's end, the city was suing the Votomatic vendor, Datamedia, and had decided to return to the automatic voting machines.

Things weren't quite so bad in Los Angeles, which had experienced similar problems, but seemed to have prepared for the worst in 1970, and ran into few computer-related troubles. Some problems with loosened chads did occur, but the inconvenience was minimal.

The weather presented a problem for some counting centers as soggy cards were impossible to be read by machine.

Observing the 10%-plus of the nation's electorate using punched-card voting, the state Board of Elections in Virginia banned the system, after studying the procedures used in Atlanta (Georgia) county.

In most cases, the various problems were human: last-minute training of poll workers, uneducated voters who were using the system for the first time, or faulty programming.

In any case, the computers only served to magnify the human errors, ultimately bringing correction, but also disenfranchisement for some voters.

Some qualified experts noted the system seems to work well where there is the time, interest, and talent to overcome these human weaknesses, such as in smaller or less densely populated districts.

Crises Included Humans, Nature

(Continued from Page S/1)

using long lines interstate to "wiretap" the computer of another T/S firm, literally draining it of proprietary data.

Man, Nature vs Computers?

Tons of water, whipped into a blinding spray by 180 mile-an-hour winds, slashed into a bayside Texas town in July ripping away the power lines for the computers that escaped the deluge of salt water or the pounding of flying debris.

The community of Corpus Christi had known hurricanes before, but now the data processing community knows the fury of hurricane "Celia."

In August it was man again as radicals bombed the University of Wisconsin's computers in the Army Math Research Center. They killed a man in that bombing, ruined equipment and wiped out a total of 13 years of work for nearly 50 people.

September brought the heat and the power shortages.

In Los Angeles, in October, a grand jury indicated three employees and a former employee of Welfare's DP center for a swindle that netted about $50,000. Eleven people were involved in using a computer to make false welfare payments.

November passed free of crisis, but the worries and the planning for crisis stayed.

In December, that planing paid off for the University of Kansas when a bomber could "only" blow a hole in a wall instead of ruining a DP center and most of its equipment and work.

The year of crisis is over, so is the summer heat. But power shortages loom with a near depletion of fuel.

While the number of student radicals is apparently decreasing as their causes become less and less popular, their smaller numbers become increasingly more determined, more proficient.

Was 1970 the first year in the decade of crisis?

Editor's Note

The year-end review was compiled and edited by Staff Writer Ed Bride, with contributions from the entire editorial department.

Bride joined CW in November 1969, three days after being discharged from the Navy.

Bride's Navy training included weapons guidance systems, analog computers, personnel, and public affairs, before being assigned as administrative officer at the DP center at Quonset Point, R.I.

ENTS SIGMA 9.

How we see it.

Sigma 9 is a powerful computer—up to 2,048,000 bytes of directly addressable memory. It is fast—up to 1,200,000 instructions per second. It performs equally well in transaction-oriented, multiprogramming business environments and in real-time scientific/engineering applications.

Following are some of the features we've put into Sigma 9 to make it a remarkable hardware-software system:

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Fail-soft hardware and software. Sigma 9 is designed for maximum availability. If a failure occurs in an element of the system, the error can be quickly identified and the system reconfigured to continue operating. Parity checking is provided on all bus transmissions. Snapshot registers enable quick diagnoses of error conditions.

More throughput per dollar. Sigma 9 is priced in the medium range, but its performance surpasses far more expensive systems. Its architecture is memory-oriented. All input/output is handled by independent, asynchronous I/O processors, leaving the CPU free to compute. Hardware mapping registers provide highly efficient memory management.

Compatibility and growth. Sigma 9 is upward-compatible with Sigmas 5, 6 and 7. All user software for the smaller Sigmas runs unmodified on Sigma 9, and the peripherals are also compatible. Thus Sigma 5, 6 or 7 users can move up to Sigma 9 without growth pains, and Sigma 9 users can grow too—adding memory, peripherals—and eventually even CPU's, for Sigma 9 is designed for multi-processing.

Sigma 9 deliveries will begin in mid-1971, but you needn't wait to enjoy the unique Sigma advantages. You can order a Sigma 9 now, and we will install a Sigma 7 immediately. Then when your Sigma 9 is ready you can switch over without missing a byte.

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Contract Inadequacy Highlighted

Consumerism may have taken a back seat last year, but one particular brand of consumer emerged as a significant force in the computer community: the user as a customer.

Dissatisfaction with equipment or vendor support caused several users to bring the supplier to court, when they found out their contracts did not fully protect them.

Misunderstanding, or inadequate contracts seemed the remote reason behind most user lawsuits, and the TWA-Burroughs conflict is a perfect example.

Whether TWA "accepted" its computer, as Burroughs contends, or "permitted" its delivery because of the vendor's assurances of adequacy is the central point.

System software is another item often neglected in basic agreements, and cases were pressed with users contending that a computer could not be considered "ready for use" without adequate discussion of the operating system.

One item in the TWA-Burroughs suit deals with development of application software, supposedly to be undertaken by the user. Burroughs contends this was the area of difficulty and, as such, the manufacturer should be "exempt" from liability.

The successful prosecution of a lawsuit became more difficult, and lawyers cautioned that members of their profession should always be consulted before entering any agreement with legal entanglements.

There are even some lawyers who specialize in computer contracts, having recognized a great need and apparent lack of expertise.

The success of these lawyers in creating contracts which keep their clients out of court will ultimately enhance the effectiveness of the user in the computer community.

Independent Peripheral Sources Flexed Muscles, Entered Fray

The ranks of the suppliers of independent peripherals were swelled this year with the addition of Control Data as a source for IBM-compatible disk drives. Ampex also entered the disk business with its 2314-compatible systems, as did BASF, and Potter offered its version of this system to the user.

The independents tended to offer controllers as well as tape drives to be plugged into 360s. Potter, Telex and Ampex all got into the act.

The situation has been changed somewhat by IBM, though. First was the announcement of a replacement for the 2420 priced below the independents.

But that wasn't all. IBM had built the controller and drive in such a way that they had to be used with each other. No other IBM drive, or independent drive, can be used with them.

Another IBM announcement made the low-priced 2319 drive available to almost anyone with a 360. Again it is priced below the 2314-compatible drives offered by the independents.

Another step by IBM seems to be bent on stopping the erosion of sales of its keypunches to Univac. This seemed to be the reason behind the introduction of the latest 129 keypunch/verifier, which has an 80-character buffer.

Among more significant innovations this year were the use of photochromic glass in a terminal by Corning to eliminate refresh circuits.

A new area of compatibility, bulk memory, was exploited by such firms as Advanced Memory Systems, Data Recall, and Fabri-Tek. Telex completed this year's list of compatible devices with its plug-to-plug compatible printer.

Several firms had products dedicated to solve the problem of getting a hard copy out of a soft copy device. Among those offering hard-copy of CRT displays were Tektronix and Photophysics.

Computer-compatible Silen printers enjoyed some attention, with the A.B. Dick unit that uses a flow of ink as one example and the 5,000 line/min IBM-compatible Varian electrostatic unit as the other.

Quantor came out with a from-the-ground-up Com system for the initial user, and Kodak and Datagraphix offered newer models.

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Establishment Shows 'Social Conscience'

(Continued from Page S/1)

will enable law enforcement officials to retrieve records of individuals' contacts with the judicial system with real-time efficiency.

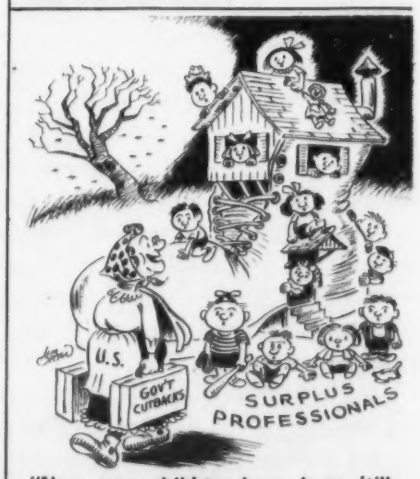
There is still some controversy as to what increased security and privacy measures might be implemented in the "rap sheet" file.

The president of the Association for Computing Machinery spoke out against the "blame the computer syndrome" which is causing much misunderstanding of social and economic problems.

Walter Carlson called on the members of the computer community's senior society to "step from behind our consoles and speak up" on social issues.

The ACM Council also urged members of the association to familiarize themselves with the issues in the case of a black programmer who claimed his civil rights had been violated by the setting of an allegedly high bail after he was charged with a bombing conspiracy.

Although precluding official action in the case, the council did show concern for the individual, and the official discussion of such a matter set a precedent within a community formerly considered staid and unconcerned.



"Now you children keep busy 'till Mama comes back in a few years."

'Decade of the User' to Get Feature Billing in 1971

By E. Drake Lundell Jr.
CW Computer Industry Editor

According to philosophers, past is prologue – the events of tomorrow are conditioned and shaped by the events of today.

And so it is in the computer community – trends developing in 1971 will be colored by the past and especially by the economic shakeup in 1970.

In the past year, users were forced into a more independent stance than ever before and will have more influence in shaping all areas of the industry beginning in 1971.

This user influence will force manufacturers not only to know their machines, but also the "applications and the industry we are trying to service," according to Christopher J. Lynch, Honeywell vice-president of marketing.

The manufacturer, Lynch said, will have to make systems that "actually help the customer run his business." From now on computers will "be evaluated the way any tool is evaluated – on return on investment," he added.

So in 1971 there should be an increased emphasis on user needs and less emphasis on daring new technological feats from the manufacturers.

Input, Interface Interest

User interest will also spark introduction of more direct input devices and lower cost CRT units for man-machine interface. And the interest in specialized common carriers will remain high, with the start of some services in this field.

In the mainframe area, there will be new systems, but not as many as in 1970. A great deal of interest will be in the area of semiconductor memories for these systems, with several firms following the lead of IBM, which wasn't first, but the largest to use this approach.

One hallmark of 1971 will be a continued consolidation among the shakier firms in the industry, which experienced the greatest economic effects during the present slowdown. Watch for consolidation in time-sharing, service bureaus, minicomputers and displays.

Consolidation will benefit the user in the long run, but will cause some problems in the short term for users who have or will purchase equipment from the weaker firms. The problems will involve parts and service for already installed equipment.

But in the long run, the benefits will include vendors better equipped with larger sales and service staffs to meet user needs and requirements. The larger vendors will also have beefed-up capital for research and development, which should cause prices to come down.

'Idiot-Proof' Systems

In the area of technology, most work will be aimed at making systems more people oriented – or "idiot proof," as it is sometimes called. The thrust will be in making systems easier for people with little or no training to use.

Analysis and Projection

However, research will continue and be stepped up in such areas as optical memories and computers, micromagnetics such as the bubble memories, and optical systems for data transmission. Don't expect anything startling, however, as research budgets were heavily cut during the continuing 1970 recession.

The emphasis in software development will be in the areas of making computers easier to use, much as in the peripherals end of the industry. There will be a comeback among the independent software houses after a period of consolidation.

Software aids to increase computer utilization and keep costs down will receive impetus from the economic slowdown and the user needs in this area.

In 1971 we will see the continuation of the trend toward large data bases on the part of many users with information retrieval being the watchword.

"We are approaching the point when it will be just as economical to store information in the computer as it is to write or print the information on paper," according to Dr. Thomas Marill, president of Computer Corp. of America.

This trend will cause an "increasing awareness" of privacy and security of data banks containing sensitive information, he added.

How the issues of privacy and security are handled on the political and social level will have a great bearing on the future of the information retrieval business, he warned.

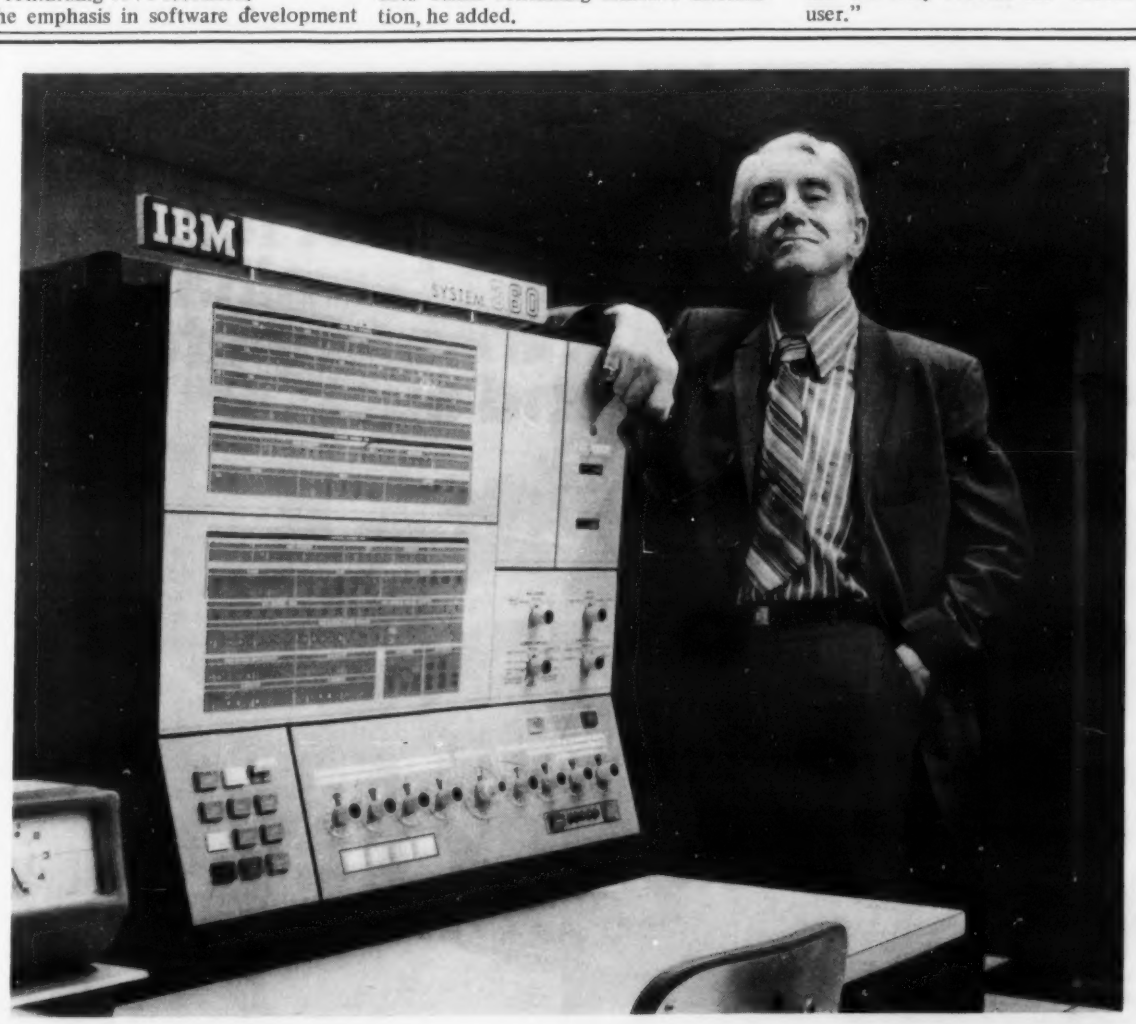
Information *per se* will also come to be seen more and more as a saleable product in 1971, continuing a trend begun in the late '60s, but accelerating next year as the technology and markets become better defined.

The 1970s have been billed as the "decade of the user" by many "citizens" of the computer community, and this will truly come about beginning in 1971.

The economic problems of 1970 have left the user better equipped to access his needs and to make his desires and wants known to the manufacturers, as well as in the political realm.

Past is prologue – the conditions of 1970 have made it possible for the rest of the '70s truly become the "decade of the user."

'I hope God punishes you for this'



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Consumers Lose in Year of Crisis

WASHINGTON, D.C. – This decade was to have started with the "year of the consumer."

Instead, the financial, power, and security crises of computer users overshadowed the billing, subscription, and credit bureau predicaments of the citizenry being "served" by computer technology.

Little time was spent pushing consumer legislation, computers continued to be accused of errors in billing and subscription handling, and a computer used by at least one company was actually named in a lawsuit as contributing to billing problems.

Two legislative bills aimed at improving the use of computers when dealing with a bill-paying public died in the Banking and Currency Committee of the House.

One was intended to hold a creditor liable when it was shown that he had made a "willful and persistent refusal" to make corrections in computerized accounts.

The other bill would prohibit creditors from reporting disputed accounts to credit bureaus, many of which collect and disseminate credit information by computer.

Also in the capital, Mrs. Virginia Knauer, the President's top consumer adviser, criticized the "wall of computers" which removed people from the "complaint-handling process."

The Federal Trade Commission, and a midwest Better Business Bureau, used computers to help *collect* information about other industries which might have a high degree of customer dissatisfaction.

So, while the issue of "computer errors" remained prominent, the use of computers to discover other areas of consumer problems helped balance this prominence.

User Response in Carrier Issue Headed Communications News

By Ronald A. Frank
CW Technical News Editor

Aroused communications users recognized a need for better data facilities and responded in unprecedented numbers last year to an FCC request for opinions on the proposed special common carriers.

Marking an increased awareness of the often complex regulatory issues, more than 100 data users told the FCC that the new data services were urgently needed.

The replies, more than double the amount generated by the commission's earlier computer inquiry, overwhelmingly supported the microwave data services proposed by MCI, Datran, and others Various FCC statements, but no definite decision, also apparently supported the applicants.

Most of the users also expressed frustration encountered with having to rely on the Bell System as a source for data facilities.

Two other questions were of importance to computer data users.

The first, commonly referred to as the FCC tentative ruling, said that existing common carriers such as AT&T and Western Union should be allowed to provide data processing services only through completely separate subsidiaries.

In a related question, the commission said that services offering both data processing and communications to users would be classified as "hybrid" offerings.

It added that if hybrid services were predominately communications-oriented, they should remain regulated, while those that were primarily data processing-oriented should be free from regulation.

The second FCC issue was the long-awaited National Academy of Sciences report on the interconnection of non-Bell equipment to the phone network.

Although the report generally confirmed AT&T's claim that non-Bell devices could cause harm to the network, the report reached no conclusions on the problem, other than suggesting that a method be found to certify these units.

The Bell system's efforts to increase rates of time-sharing users were stalled when Ohio Bell agreed to withdraw a proposal for its Information System Access Line (Isal) tariff.

The Isal proposal seemed to be part of an AT&T plan to segregate the computer user and charge him higher line rates. Although the merits of the Ohio Isal proposal were never tested, the same issue was pending in Illinois as the year ended.

Operating Problems

User problems uncovered by CW included faulty operation by some acoustically coupled computers. These were traced to the telephone handset which in some cases had been left continuously connected to the couplers.

The affected users were experiencing a loss in transmitting capability which was traced to "packing" of the carbon granules in the phone handsets. Periodic movement of the handsets eliminated the problem in most cases.

In July, AT&T officials acknowledged a problem with Bell's 202E9 data set. Some users were unable to transmit data on the unit's reverse channel apparently because unwanted signals from local radio stations and power lines were being picked up. A Bell spokesman commented that a "quick fix" had been developed to eliminate the problem.

Other events affecting data users included FCC approval of the AT&T teletypewriter exchange network (TWX) to Western Union. Since WU now operates the Telex network in the U.S., the possibility of TWX and Telex users being interconnected came one step closer to reality.

But most observers felt this step will still take several years to complete after the TWX sale is finalized next year.

Although some changes were made in AT&T's data tariffs to allow sharing of lines, most data users still found facilities expensive, and service less than dependable in many areas.

Those users looking to the new specialized carriers to provide relief from the data-burdened phone network realized that even with full FCC approval neither MCI nor Datran could be in operation for several years. At year-end AT&T had laid out plans for its own digital data network for computer users and MCI was hoping to have its first network link from St. Louis to Chicago in operation by March of the new year.

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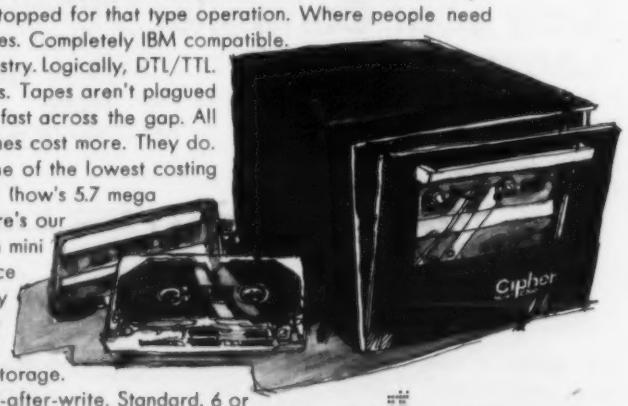
*patent applied for



Cipher Data Products

Computer Makers Introduce Biggest Crop Since 1965

By Frank Piasta
CW Staff Writer

Major systems announcements made the past year the most significant since 1965, and perhaps in history, for new or expanding users.

Nearly every major manufacturer chose 1970 to introduce new products, either additions to an existing series or an entirely new line. In some cases this distinction was difficult to make.

The watchword for the year seemed to be "evolutionary." No one of the new systems represented a complete break with the past; compatibility was stressed. Although new technologies were adopted, every new major system could use the software written for its predecessor.

The IBM System/370s broke a company tradition of conservatism: IBM introduced a solid-state main memory, writable control storage, and price/performance ratios superior to those of the 360, while maintaining software and peripheral compatibility with the older systems.

In the area of small computers, the name of the existing System/3 was modified to say "Model 10" in order to allow for a less-expensive, keyboard-oriented version called the System/3, Model 6. The System/3 was enhanced by the addition of communications capability, eliminating one of the major weaknesses in the original configuration.

Burroughs also announced a series that was closely related to earlier systems, the B700 series, consisting of the B5700, B6700, and B7700. The new family offered more power, more multiprocessing, and more communications capability than did the B500s that it replaces.

The Spectra/70 series was refurbished by RCA to produce its four-model series. The RCA 2, 3, 6, and 7 were really enhancements to existing lines, but offered more performance for the money.

As with IBM, the RCA and Burroughs systems used the same software and peripherals as did the systems they replace and/or enhance.

NCR added on to both ends of its Century series of computers this year. The Century 300 extends the range of the series into the medium to large-scale area with memories as large as 2 Mbits and cycle times of 650 nsec for 4 bytes. At the other end, the disk-based Century 50 was trotted out to do battle with the System/3 for the attention of the small users.

Still More

XDS added a new, more powerful version of its time-sharing Sigma 7, with the Sigma 9 which features multiprocessing. Another entry from XDS was the Sigma 6, the first system from that company intended for commercial data processing, specifically.

Univac unveiled the frequently delayed 1110. Compatible with the 1108, the new system has enhanced multiprocessing capabilities and a sophisticated, communications-oriented I/O architecture.

Designed to compete with the middle of the IBM line, the CDC 3170 offers compatibility with the company's 3300 and 3500 and brings some of the former system's multiprogramming power into the 3100 price range.

CDC also announced three new, smaller versions of the 7600 "supercomputer" and a new member of the 6000 series, the 6200, in the medium-price range.

Honeywell's new system for 1970 was an addition to the small end of the Series 200 family, and disk-oriented 115. Priced between the 110 and 120, the 115 features a 2.75 μsec cycle time.

Software Patents OKd

WASHINGTON, D.C. – Software patents became a reality in 1970, ending a seemingly endless campaign by programmers and lawyers to obtain protection for unique computer processes.

The U.S. Court of Customs and Patent Appeals (CCPA) ruled late in 1969 that computer programs *per se* could not be excluded from the realm of patentable inventions.

The CCPA then ruled last spring that "technical language" could be used to describe such inventions . . .i.e. language "understandable to those skilled in the art."

Then, in July, Walter D. Bernhart and William A. Fetter were issued their patent for planar representation of three-dimensional figures, the first true software patent.

The program had been used in a television advertisement for Norelco shavers, during which a "computer man" explains the advantages of the product. The program "drew" the series of drawings in the cartoon.

Some observers believe the age of computer program patentability really started in October, with the issuance of the Autoflow patent to inventor Martin A. Goetz. Autoflow debugs and creates flowcharts for users' programs, and was in use in about 1,400 computer installations at year-end.

The patent was assigned to Applied Data Research, the software house of which Goetz is vice-president. It is the first marketed program to receive patent protection, and as such, even fits IBM's definition of a "software" patent.

The IBM definition calls for the actual marketing of a product before it would be considered "patented software."

As such, IBM employee Janice Lourie would not qualify, since her patented program interfacing a computer with a fabric loom is not being sold or leased.

With the Bernhart-Fetter reversal of Patent Office rules, the Lourie and the Autoflow patents were actually the first such issuances without objection by the Patent Office.

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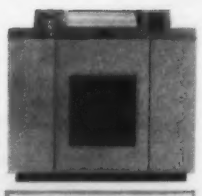

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Test Matrices Give a 'Taste'

By Paul F. Hultquist
Special to Computerworld

"A Collection of Matrices for Testing Computational Algorithms," by Robert T. Gregory and David L. Karney, John Wiley and Sons, Inc., 1969, 154 pages, $9.95.

"The proof of the pudding is in the eating" is an ancient adage that applies all too well to computer programs.

Fortunately, for those who do extensive matrix computations, there is available a "taster" in the form of a collection of test matrices assembled by Gregory and Karney.

In certain cases matrix computation can be fraught with difficulties – sometimes unrecognized. In the words of the authors, "It is well known that a good mathematical algorithm may not be a good computational algorithm."

What is not as well known is how to test a matrix program for susceptibility to error in the troublesome cases. This book gives us some of the tools.

The authors discuss methods of constructing test matrices, and explain how to determine the exact values for the elements of the inverses and the eigenvectors, as well as eigenvalues.

Examples are given for matrices of order as high as 20. For readers with a mathematical background there is a brief treatment of the material of concern and an extensive bibliography.

For those who merely want to test a program there are problem matrices together with correct results for comparison.

Gregory and Karney are to be complimented on the careful presentation of the material and commended for making it available. Although the book is printed from typescript, it is pleasing in appearance and much more readable than the usual typewritten copy.

Paul F. Hultquist is assitant dean of the University of Colorado and a professor of electrical engineering.

Elementary Text

Numerical Analysis Errors Pointed Out

By Yudell L. Luke
Special to Computerworld

Numerical Algorithms: Origins and Applications, by Bruce W. Arden and Kenneth N. Astill, Addison-Wesley, Reading, Mass., 1970, 308 pages, $11.95

The purpose of this volume is to introduce the reader to numerical problem solving with digital computers. Prerequisites include the calculus, some differential equations and the ability to program for a digital computer as the algorithms are programmed in Fortran IV language.

Though the emphasis is on numerical methods and concertration on computing is rather minimal, the volume does retain a connection between the two.

From the vantage point of numerical analysis in the large, the present text is elementary. A danger often noted in elementary texts is leaving the reader with the impressions that the techniques presented are a panacea. Not so with this one.

The reader is constantly reminded of various sources of error and pitfalls that can arise. Indeed, the very first chapter is concerned with types of errors, significant digits and error arithmetic.

The authors have considered those topics most often met by practicing engineers and scientists – for example – Taylor series, differences, interpolation, differentiation and integration, solution of linear and algebraic equations, and ordinary and partial differential equations.

I recognize that authors feel under pressure to include more material than can be accommodated in a text of this sort. Though the volume has good balance, there are a number of points on selection of material that came to mind. I'll deal with two.

In the discussion of algebraic equations, the authors should have at least outlined Bairstow's method. In this connection, discussion of Lin's method could have been omitted. Secondly, the discussion of numerical integration could have been enhanced by allowing for singularities in the integrand.

Numerical examples, problems and flowcharts illustrating the discussion are liberally sprinkled throughout. A number of exercises are given at the end of each chapter.

Yudell L. Luke is associated with the Midwest Research Institute in Kansas City, Mo.

Book Reviews

Background Information Provided on Data Banks

By Joseph Hanlon
CW Staff Writer

On Record: Files and Dossiers In American Life, edited by Stanton Wheeler, Russel Sage Foundation, New York, 1970, 449 pages (including index), $12.50. (Order from Basic Books, 404 Park Ave. sotuh, New York 10016.)

Secrecy is basic to the operation of data banks, making it difficult to discuss them intelligently. *On Record* is an attempt to fill the information gap; from it you can find out what your employer, your school, the credit bureau, and some government agencies are likely to know about you and who they will tell.

In some ways, the book is disappointing. It is a collection of articles by social scientists who, according to Wheeler, were "in the best position to become familiar, in a relatively brief time, with the distinctive features of record keeping" in a particular organization.

Written by scholars rather than professional authors, the book is frequently dry and academic. And much stress seems to have been placed on the "brief time": the authors have generally relied on what they were told by organization officals, usually in questionnaires, and have not checked to see if practice agreed with theory.

Damning Data

It is remarkable that the authors got as much damning information as they did; for example, that 15% of the schools surveyed would allow prospective employers complete access to student records, or that only 10% of the companies queried required a person's permission before giving out information on him.

Not as well written or researched as might be hoped, *On Record* nevertheless provides much information not available elsewhere.

Also attempting to provide background information on data banks, the *New York Times* reprint house Arno Press (4 E 43 St. New York 10017) has reissued two of the most important Congressional studies on data banks:

Government Dossier is ex-Sen. Edward Long's definitive 1967 survey of all personal information on file by the government. It revealed, for example, that U.S. citizens are in government files three billion times.

Only Listing

Although somewhat out of date, it remains the only listing of what information each government agency collects. The indexes, by the way, are buried on pages 45 and 348.

The Computer and Invasion of Privacy ($4.95) concerns the hearings by Rep. Cornelius E. Gallagher (D-N.J.) in 1966 into the proposed National Data Bank. Now that talk of the National Data Bank is being heard again, it is instructive and still quite timely to reread these hearings.

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'Basic Approach' Requires Patience

By Walter J. Samek
Special to Computerworld

Introduction to Programming: A Basic Approach, by Van Court Hare, Jr., Harcourt, Brace & World, 1970, 436 pages, $9.50.

This is a very solid, well written book; but if you want to learn programming you had better arm yourself with patience. A description of actual programming techniques does not occur before chapter seven.

But the first six chapters are not wasted by any means for the right kind of readership. If a person wants to get a wide-ranging, if somewhat condensed, bird's-eye view of the entire computer scene, of its history, philosophy and design, then he will find these chapters of great interest. While not making him an expert, they will give him a good idea of the basic concepts of computers.

Chapters seven to 16 are devoted to a detailed exposition of Basic, with lots of practice problems and numerous application examples. But my son, who is a junior in high school, tried to use the Basic taught in this book on the school's PDP-8 and found, to his keen disappointment, that the PDP-8, having a basic Basic compiler, did not understand the Extended Basic of the book. Already there are dialects of Basic!

Fortran Ahead

After the chapters on Basic it is full speed ahead into Fortran. The student is led to realize the shortcomings of Basic and is shown how, by using Fortran, he assumes command of a more extensive array of tools to handle many types of data processing problems.

The exposition of Fortran is far from complete, but references to specialized Fortran manuals are provided.

A glossary of computer terms and an index complete the book.

The book is well suited for self study, and may be used for suitably structured college and advanced high school courses.

Walter J. Samek is employed at Combustion Engineering Inc. in Windsor, Conn.

IBM 1130 Users Get Fortran Book

By Ned Chapin
Special to Computerworld

Business Programming the IBM-1130 by William T. Price, Holt, Rinehart, and Winston, New York, 1970, 330 pages, $5 paperback.

This is a book on Fortran for IBM 1130 users who want to use the IBM-provided Commercial Subroutine Package (CSP). The author assumes the reader knows Fortran and the IBM 1130.

The book provides some nice examples and many portions of programs and a number of complete programs written in Fortran. It provides explanatory diagrams and pictures of punched cards and gives much attention to data format.

But the book is very weak on algorithms and has only a few flowcharts out of its many illustrations.

Also, the book seems long-winded. The IBM manual (H20-0241) on the CSP is much shorter, covers the same ground, and is only a little bit harder to read for someone who knows Fortran.

Ned Chapin is an independent consultant in the field of data processing.

Industrial Sites Located

MONTGOMERY, Ala. – Development of a computerized system of locating industry in Alabama is scheduled as part of a $250,000 federal grant.

Boeing Corp., Huntsville, will provide technological aid.

User Tests Confirm Effectiveness of WTCS Utilities

By Don Leavitt
CW Staff Writer

SYRACUSE, N.Y. – A local user of the Westinghouse Dump/Restore/Copy utility package [CW, Nov. 4]has run a series of benchmarks which demonstrated that the package outperforms comparable software available from IBM.

The package consists of three separate programs, to handle disk-to-disk, disk-to-tape and tape-to-disk copying of files. The programs are compatible with IBM's DOS, are self-relocating. The package is available from Westinghouse Tele-Computer Systems Corp. (WTCS).

As a result of its tests, Colt Industries Crucile Speciality Metals Division said that it expects to save $1,500 a year by replacing its IBM-supplied software with the WTCS package, for a one-time charge of $700.

Colt performed its tests with a full disk volume on a 128K 360/40, under DOS, with 1 Selector Channel, using Memorex disk drives.

The tests confirmed that the WTCS package is two to three times faster than IBM's software. Colt also noted that the programs used one third less magnetic tape than the comparable IBM programs.

Copying the Sys pack required two tapes and took more than 30 minutes, using the IBM utility, while less than a full tape was needed with the WTCS program. The lower tape consumption will provide a cost saving beyond that originally anticipated, Colt said. The WTCS utilities also required fewer JCL cards than the IBM software, Colt said.

The package is available from WTCS, Pittsburgh, Pa.

Utility Function	IBM		Westinghouse		Increased Throughput (%)
	Min	Sec	Min	Sec	
Disk to Disk	26	13	9	44	277
Disk to Tape	15	54	3	30	471
Tape to Disk	15	08	5	13	291
Total	57	15	18	27	311

Colt reported these results on the benchmarks it ran comparing IBM and Westinghouse utility packages.

'GIS/2' Outperforms Earlier Version

WHITE PLAINS, N.Y. – A new version of the IBM Generalized Information System (GIS/2) is highly modular and allows the OS/360 user to build an inquiry and file maintenance system, feature-by-feature.

The GIS/2 is not only more flexible, but will out-perform the original GIS. Depending on the mix of compiler and execute functions used, overall run times should average from two to three times faster, IBM said.

The foundation of GIS/2 is the Basic Retrieval System. This permits simple inquiries to be batch formulated against existing files organized as sequential or index sequential OS data sets.

QTAM or TCAM

Separate features that may be added to the Basic Retrieval System under GIS/2 include file update and creation capability.

The teleprocessing support feature permits the use of QTAM or TCAM with associated terminals.

To be available under license agreement next July, the total GIS/2 package will cost $1,500/mo, the same as the current version. However, the Basic Retrieval System, available separately for the first time will cost $450/mo, IBM said.

Individual features will range from $20/mo (for arithmetic statements) to $400/mo (for file update and create).

Modified PDP-8 Operating System Eases Core, Speeds Programming

MAYNARD, Mass. – Modifications to the DEC operating system for the PDP-8 provide 'significant' reductions in programming time and reduce core requirements, according to DEC.

The system, called PS-8, allows the PDP-8 to be used in time-sharing to support an 'expandable' number of peripherals.

In addition to Fortran, PS-8 allows the user to develop his programs in the PAL-8 assembler, the SABR symbolic assembler and other PDP-8 software.

The PS-8 system includes absolute and relocatable loaders, a symbolic editor, a peripheral interchange program and an octal debugging package.

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Essential Reports for Small Brokers Are Produced Under Basic 'PAR' Plans

RED BANK, N.J. – Small mutual funds, trust departments and brokerage firms can use the basic daily or basic weekly service options under the Portfolio Accounting and Reporting (PAR) system to get essential reports, according to the developer, Computer Systems Laboratories (CSL).

PAR is a batch processing system run at the CSL computer center here, in which users enter data through remote terminals, via courier pickup or through the mail.

The basic options under PAR provide profit and loss statements, purchase and sales reports and an edit listing of all input, on either a daily or weekly basis. The user also gets monthly security ledger updates, security position and fund totals reports.

The full PAR system has available a number of modular options. These include a paid and unpaid account report, and instructional letters to custodial banks.

PAR also provides a module for the optimization of selling of securities, by approximating average cost, last in-first out (Lifo), and first in-first out (Fifo), at the user's option. The system adjusts the fund position for splits, dividends, mergers, and automatically calculates commissions, state taxes and fees.

The basic weekly service option is availble for $175/fund/mo plus fifty cent/trade. The basic daily service costs $294/mo for the first fund and $168/mo for each subsequent fund, plus ninety six cent/trade.

Computer Systems Laboratories Inc. is at 176 Riverside Ave.

Stores Can Use ATS Services, Software

NEW YORK – Retail sales organizations can gain objective evaluations of computerized point-of-sale equipment through the consulting services of Automated Transactions Corp. (ATC).

The Retail Information System (RIS) package developed by ATC is built up of a number of sub-systems to meet a user's needs.

Automated Transactions Corp. is at 501 Fifth Avenue.

Computeria Puts 'Stat' Package On T/S Networks

BRAINTREE, Mass. – Economists, researchers and engineers can perform immediate correlation and regression analyses on data by using the Stat statistical package available on several time-sharing services through Computeria Inc.

With Stat, data is entered on-line to create stored files which are reusable for selection, transformation, reorganization and combination.

Stat is said to handle data files containing up to 200 variables with up to 200 observations each. Up to 25 variables may be processed in a given equation.

The names of the time-sharing services for Stat is available from Computeria Inc., 14 Wood Road.

HOW do things look for the computer industry as the pause in growth apparently is ending?

The current "Gray Sheet" -- a Midyear Review -- examines the status of each major mainframe supplier and all industry segments. Send for the current issue -- $8. Or, go ahead. A year's supply only costs $75.

EDP industry report

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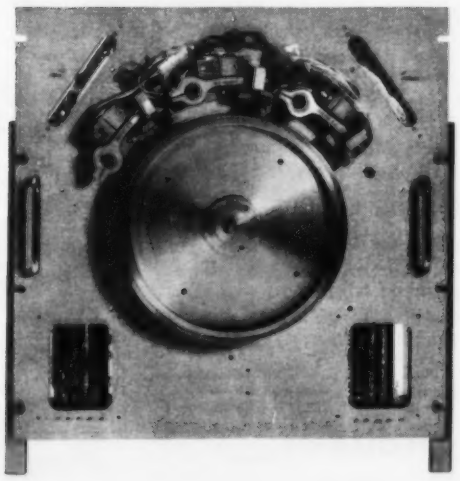

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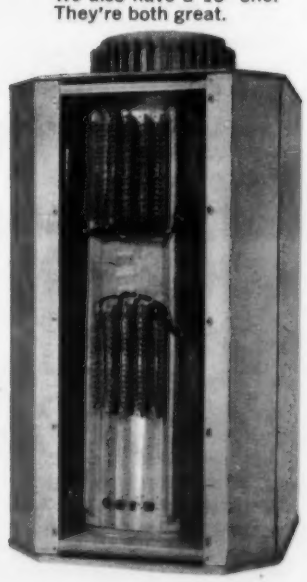
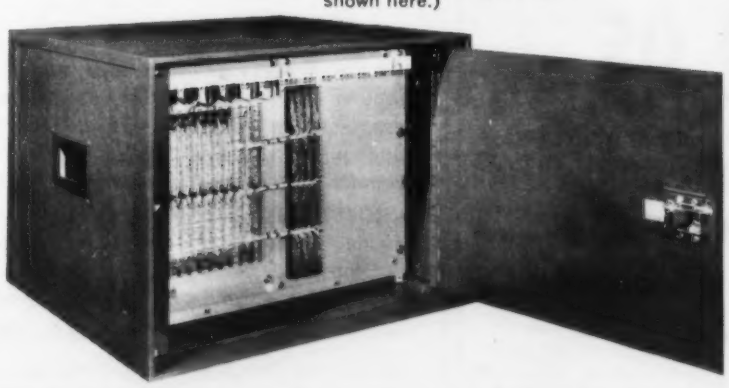


The 720 Mini-Controller. The Napoleon of the computer industry. (Can interface with anything shown here.)



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Financial Reporting System Condenses Multiple-Subsidiary Monthly Figures

HOUSTON – Managers can cut the time needed to consolidate monthly reports from multiple subsidiaries, and get more information for measuring a subsidiary's performance, with the Financial Reporting System (FRS), according to the developer, Information Services Inc. (ISI).

FRS is available as a package for user's in-house operation on a 360, or as a service from ISI.

Under FRS, management can review current month and year-to-date results in comparison to budgets and prior year performance, for all reporting levels.

The subsidiaries have only to report year-to-date results and revisions in the latest earnings estimate, to use FRS. Current month results are computed by the system, and monthly financial data is retained in the system for current and prior years.

This approach is the reverse of the usual reporting system, ISI noted, and takes advantage of the fact that most subsidiaries always have year-to-date figures available, as part of their general ledger accounting systems. Other systems require the user to determine the changes in year-to-date figures from one period to another, to report current month figures.

Written in Assembler Language, FRS has been implemented on a 32K 360/30 under DOS. It requires three tape and two disk drives.

FRS costs between $10,000 and $15,000, depending upon the amount of customizing required to meet the user's needs. One man-week of on-site implementation aid is included in the cost, plus one year maintenance.

Users who wish ISI to perform the processing will be charged $25/subsidiary/mo. in addition to the original cost of the package.

Information Services Inc. is at 3130 Southwest Freeway.

Western System Gets CRT Access

SAN FRANCISCO – A visual display inquiry software system is available from Western Operations, Inc. for use with its mutual fund accounting system, System '70. The new capability will provide real-time inquiry into shareholder account information and rapid alphabetical searches.

Hardware independent, the visual display system can be operated with numerous remote terminals such as the IBM 2260 CRT. The line control portion of the system is also multi-purpose and can be used by other applications to display information.

The visual display inquiry system sells for $25,000. It is also available with System '70 on a two-year lease program.

Western Operations is at 120 Montgomery St.

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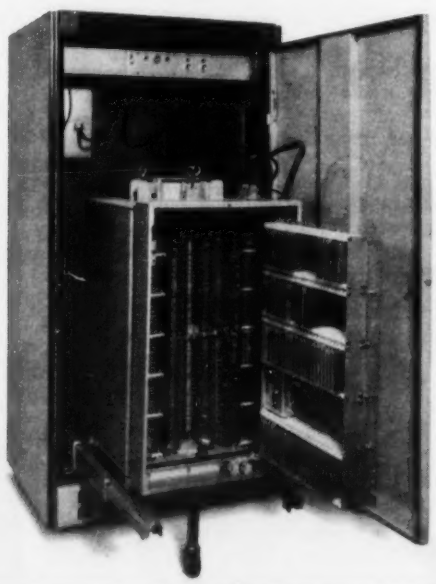

The CD Drum Series. Shown here, the 10" model. It remembers twice as much as it used to. You should see its big brother.

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IBM CE Can Phone Test Center For Data System Diagnostics

By Don Leavitt
CW Staff Writer

RALEIGH, N.C. – Customer engineers servicing IBM teleprocessing equipment users throughout the U.S., can telephone the firm's Tele-Processing Test Center, here, for diagnostic assistance. On-line testing of terminals and other communication equipment can continue without interrupting other system operations at the user's installation.

Present on-line test devices are said to provide access to the test center for about 20% of IBM's teleprocessing equipment. Another diagnostic device, still in development but expected to be available next year will upgrade this capability to about 90% of the product line, IBM said.

The new, portable 1,200 bit/sec Terminal Diagnostic Analyzer and Tester (TDAT) will be especially useful to installations using dedicated communications lines because it makes available the facilities of the IBM test center without interrupting the customer's use of such lines. IBM said that the present test devices are limited to installations with access to the dial-up phone network.

After the IBM engineer accesses the test center and signs on with a special identification number, the center's computer automatically runs a general diagnostic test. Specific tests tailored to a particular problem can also be requested, IBM said.

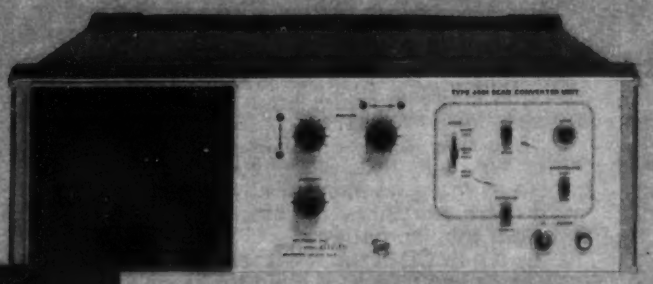
The center's computer tests the customer's terminal and control equipment with a series of exercises which indicate whether or not the IBM equipment is operating properly. If it is not, the center's system is said to be able to inform the engineer of the probable location of the malfunction.

The TDAT, being developed by IBM's Field Engineering Division, will be able to exercise terminals and other equipment to identify transient problems. It features an acoustic coupler and modem that allows connection through leased or dedicated lines.

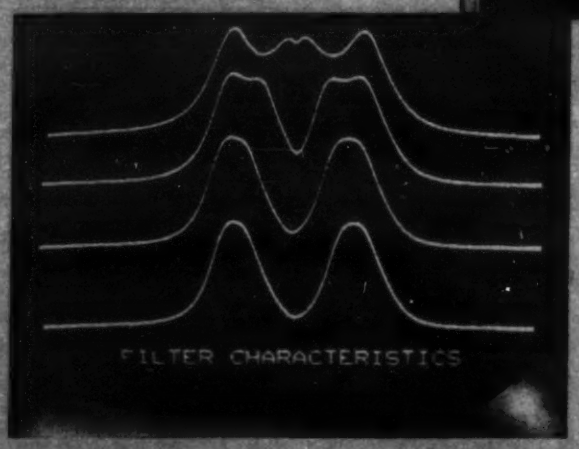
A tape recorder on the unit can record data as it is transmitted to or from a terminal, for verification purposes, and can also be used as an exerciser so that the user's CPU can continue operating.

With the new test unit, the customer engineer will be able to test off-line terminals which operate at data speeds ranging from 45 to 1,200 bit/sec, IBM noted.

Large Screen Displays



Link your data or signal source to TV display systems with Tektronix scan conversion . . .



for convenient viewing in labs, classrooms, production lines, hospitals, computer installations and many other areas.

The display size depends only upon your choice of TV monitor or receiver.

The 4501 Scan Converter accepts alphanumeric and graphic data—in the form of analog inputs—and converts it to displays on TV receivers and monitors. The hi-contrast TV displays are ideal for individual or group viewing—even under bright light conditions. The displays may be viewed as light data on a dark background or as dark data on a light background, selected from the 4501 front panel.

The 4501 uses a Tektronix bistable storage CRT. Data may be written once on the storage CRT and retained for an hour *without refreshing*. The results are: call for your data once, then view it as long as one hour on a TV-size display. Besides that, the 4501 transfers continuously written data to your TV display.

MULTIPLE DISPLAYS—The 4501 will drive multiple, inexpensive receivers and monitors. The units may be located locally or remotely. Outputs from a TV camera can be mixed with data from the 4501 to produce a picture that is an overlay of the two signal sources. With overlaying, you can instantly compare data from two different sources.

The uses for the 4501 are virtually unlimited. For a demonstration, contact your local Tektronix Field Engineer or write Tektronix, Inc., P. O. Box 500, Beaverton, Oregon 97005. See your current Tektronix catalog for specifications.

4501 Scan Converter $2500

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Communications

Isal Plan Described At Illinois Hearing

CHICAGO – AT&T's proposed Information System Access Lines (Isal) tariff would increase rates for "any automated information [computer] system with two or more lines" by as much as 624%, if approved.

This was revealed by a spokesman for Illinois Bell Telephone Co. in hearings before the State Commerce Commission, considering the proposed rate plan.

The rates Bell proposes to impose under the Isal tariff would be based on Private Branch Exchange (PBX) tariffs, which are currently the highest rates in effect in Illinois, according to one observer.

Illinois Bell rate engineer, L.R. Stang, testifying at the hearings, said that customer lines covered by the proposed Isal tariff would be limited to incoming calls only. Affected computer data users would have to install extra lines for outgoing calls under such a plan.

Apparently the Isal tariff would apply only to data users with two or more lines terminating at a computer. According to Stang, users with one incoming line will continue to be billed at normal business message rates even if the Isal proposal is approved.

Intervenors, who as users of Bell facilities oppose the Isal plan, include General Electric, Com-Share Inc., the Computer Time-Sharing services Section (CTSS) of Adapso, and the Village of Golf, Ill.

The hearings are scheduled to resume Jan. 4, and a decision on the Isal plan is not expected until next spring.

Digitronics Modem Replaces Bell Data Set, Costs $4,200

ALBERTSON, N.Y. – The Model 3300/36 modem from Digitronics Corp. is a plug-to-plug replacement for the Bell 203 data set and operates at 3,600 bit/sec.

The modem is compatible with both attended and unattended versions of the Bell DAA, and uses an RS 232C interface.

The modem is priced at $175/mo or $4,200, on 30-day delivery.

Bits & Pieces

Keytape Pooler-Converter Can Save Computer Time

SAN DIEGO, Calif. – A pooler-converter for Honeywell Keytape devices, the 970, can save users computer time and increase data-entry flexibility.

The device allows pooling of data from both 7- and 9-track magnetic tape, and provides data conversion between even-parity 7-channel BCD code to 9-channel Ebcdic format. Lease price is $80/mo, with purchase at $2,400.

Standby Power From Batteries Used to Keep Computers Running

MEDFORD, Mass. – The Model #UPS Emergency Power Unit, from Standby Systems, Inc., will keep computers operating without even a momentary time lag between a power failure and power takeover by the battery, the firm claims.

The unit is available in sizes ranging from 250 W to 3kW in 250 W increments. Prices start at $1,500 from 33 Ship Ave.

Pulse Solid-State Memory System Provides Intermediate Storage

BAILEYS CROSSROADS, Va. – A solid-state memory, designated DSU, capable of storing 4,000 to 40,000 characters from Pulse Communications provides intermediate storage between communications lines, from $1,500.

It is intended to replace paper tape transmitters and readers in message switching systems where data must be stored when being passed from one circuit to another. First units are available from 5714 Columbia Pike.

Ribbons Can Be Reused 4 Times After Reconditioning Process

SOUTH EL MONTE, Calif. – A ribbon reconditioning service offered by Wespac Division of Westates Space-Era Products is said to allow printer ribbons to be re-used as many as 4 times without loss of quality.

The process replaces ink that is removed during printing and treats the ribbon fibers so they regain their original shape. The service is available through licensed Wespac ribbon service centers in more than forty cities.

Datagraphix Carrousel Film Rack Stores 576 16mm Cartridges

SAN DIEGO, Calif. – A carrousel file for open storage of 16mm film cartridges from Stromberg Datagraphix, Inc., is made of polysterene and comes in units of 5 to 48 modules.

System/3 Card Guides, Sleeves, Feature Mylar Construction

GARDENA, Calif. – Computer Accessories Co. has available card guides and sleeves designed for use with System/3, 96-column tab cards. The guides have Mylar-insertable tabs and self-indexing sleeves from 131 W. 154th St.

Air Wash System Uses Ionized Air To Clean Tape Reels and Cases

HOPKINS, Minn. – A system to remove dust particles from tape reels and cases, from Air Purification Methods, Inc., uses a spary of ionized air to remove dirt.

Other features of the Air Wash system include a filter fan and a dust filter to collect the removed particles, from 6340 Industrial Drive.

User Can Save 20%

Telex System Replaces New IBM Units

By Frank Piasta
CW Staff Writer

TULSA, Okla. – Users that have been considering the recently-announced IBM 3803/3420 tape system [CW, Nov. 18] can now also evaluate an equivalent system from Telex.

Called the Series 6000, the Telex system is priced up to 20% lower than the IBM system, on a purchase basis.

On a lease basis, the Telex Model 6420 Model 7, equivalent to the IBM 3420 Model 7, in an eight-drive configuration plus the 6803 controller, is priced at $5,335/mo, a saving of 11.6% over the IBM price.

The Telex drives feature a radial device attachment to the controller, allowing the user to switch a drive off-line without interfering with other drives.

Tape controller switching, available optionally, allows the accessing of up to 16 drives through the use of multiple controllers, and makes each drive available to two different CPUs, if desired.

Five models of the Telex drives are offered, the Model 3 at 75 in./sec, the Model 5 at 125 in./sec, and the Model 7 at 200 in./sec, have performance equal to drives offered by IBM. Intermediate speeds of 100 in./sec on the Model 4 and 150 in./sec on the Model 6 have no IBM counterpart.

Seven- and nine-track versions of the drives are to be made. Tape densities of 556, 800, and 1,600 bit/in. are available, with data transfer rates ranging from 41K byte/sec to 320K byte/sec.

The 6803 controller is designed to attach to an IBM 360 or 370 selector channel. It features large-scale integrated circuits with self-contained microprogrammed diagnostics for fault isolation and correction.

Lease prices of the 6420 tape drives, on a one-year lease, range from $375 to $595 per month. Purchase prices range from $1750 to $25,000. The 6803 controller prices range from $575 to $835, depending on features ordered.

Telex has scheduled first deliveries for November, 1971, one month after the IBM units.

Bendix Produces COM Plotter, Designing System for Drafting

FARMINGTON, Mich. – A plotter that can convert computer-generated digital data into microfilm drawings in less than 60 seconds and an automated designing system that uses a computer to solve drafting problems have been introduced by the Bendix Corp.

The Microplotter can produce any line art, including graphics, histograms, maps and charts, and can generate alphanumeric characters. The machine produces microfilm mounted on aperture cards which are automatically processed each time a new drawing or block of information is to be recorded. A camera can be used for roll microfilm.

Digital input can be on paper tape, 7- or 9-channel mag tape, or on-line from a computer. A storage CRT console can be included to provide a graphic image of the input data being plotted.

Writing speed is 500 char/sec. At a normal enlargement, the line drawing speed is 330 in./sec and the resolution is 0.002 in.

The Microplotter sells for $74,000, plus interface which ranges from $6,000 for Teletype capability to $35,000 for 9-track tape.

The Bendix automated design system permits digitized information to be fed into a computer using conventional drafting procedures and drawings.

Calculations which can be made with the system include areas, volumes, lengths of straight and curved lines, angles and intersections, and three-dimensional calculations.

The system sells for $19,500, which includes an output teletypewriter, acoustic coupler and Fortran II software.

Bendix Computer Graphics, is at 23850 Freeway Park Drive.

HP Coupler Connects Computers

PALO ALTO, Calif. – A programmable digital controller from Hewlett-Packard can be used to establish two-way communications between computers and such digital devices as teleprinters, laboratory instruments and data sets.

With the Model 2575A Coupler Controller, a computer can control instruments and process data by means of cables and up to four interface cards.

The Model 2575A Coupler/Controller is priced at $1,275. Card prices vary from $450 to $1,775 each. Delivery is four to six weeks.

Interface Features Selectable Rates

SUNNYVALE, Calif. – An EIA standard RS-232B interface with program selectable rates of 110 and 1,200 bit/sec is available from Dicom Industries.

Any two rate combinations of 110, 150, 300, 600, 1,200, 1,800, 2,400, 3,600, or 4,800 baud are switch-selectable and optionally available.

The interface, on a printed-circuit board, enables any RS232B serial device, such as a Bell data set, to be communicated on-line to a CPU, or off-line to a Dicom cassette tape recorder. The interface costs $350 from 715 N. Pastoria Ave.

Xebec Disk Drive System Usable With Several Minis

MOUNTAIN VIEW, Calif. – A plug-to-plug XDC-100 compatible disk system from Xebec Systems, Inc. can be used with several popular minis. Up to four disk drives can be included with a capacity of 4.9-million 16-bit words of 6.6-million 12-bit words.

Each drive can consist of either single disk or dual disk configurations, with recording densities of 1,100 or 2,200 bit/in. One disk cartridge, similar to that used with the IBM 1130, is used. The second disk is fixed.

Interfaces for the Data General Nova and Supernova, DEC PDP-8, Lockheed MAC-16, Hewlett-Packard 2114, Computer Automation 808, and Interdata minicomputers are available with data rates varying from 720K to 2.5M hz. Rotational speed is either 1,500 or 2,400 rpm with average latency time of 12.5 msec, and average head positioning time of 134 msec.

Error detection is accomplished through a checksum that is calculated and recorded by the hardware. Timing and programming errors can be detected, the company said. Cylinder, sector and track positioning are verified before read or write operations.

The XDC-100 comes with a software package that includes a name file handling monitor, diagnostic routine, bootstap loader, and drivers to simplify user operation. The monitor allows file handling capability from the mini's keyboard, all files being stored, loaded, retrieved, etc. by name, Xebec added.

Prices range from $75,00 to $10,815 for capacities ranging from 10 to 40 Mbits. The systems are available on a 45- to 90-day delivery from 918 N. Regnstorff Ave.

PDP-11 USER?

If you are now using a PDP-8 and would like to move up to a PDP-11, but are being held back by software conversion costs,

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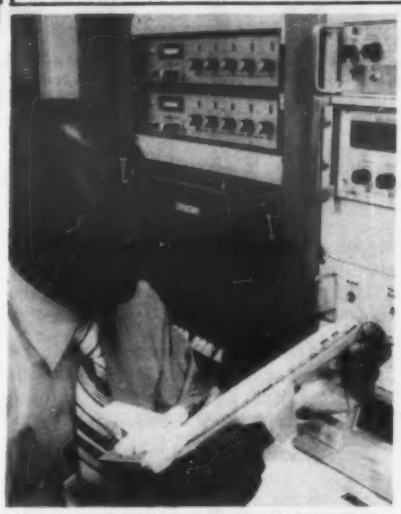
Applications

Mini Checks Out Jet Maintenance

MINNEAPOLIS – A step toward modular computer checkout equipment for commercial jetliners has been taken by Honeywell that the company said may save as much as 50% in annual maintenance costs.

"The airline industry is in a period of transition to a whole new type of aircraft with the greater freight and passenger loads of the DC-10, L-1011, and Boeing 747," said George Spell, director of service engineering for Honeywell's Aerospace Division.

The Modular Automatic Test Equipment (Mate) can handle digital equipment checkout as well as analog system maintenance testing. It also provides a modular approach that allows building of system hardware and software to meet a variety of test situations, Honeywell said.



Honeywell engineer Richard Barrett is one of the men working on an advanced ground system called Mata for checkout of the equipment of jetliners.

Richard McDermott (right) shows some of his computer-created movie scripts to Prof. Raymond Jacobson, chairman of the art department.

Movie Scripts From Computer?

NORTHFIELD, Minn. – Richard McDermott, a junior art student at Carleton College, has programmed the school's time-sharing computer to assist him in writing a movie script. He is using a computer because he believes that it adds a new capability to his writing effort.

McDermott programmed the Digital Equipment Corp. TSS-8 to "feed" him complete sentences that will serve as ideas, suggestions, commands, and even instructions, which he hopes to incorporate into the making and dialogue of a movie.

The movie is part of an art project sponsored under a National Science Foundation grant.

Words, which McDermott picked at random and identified only by their values in an English language sentence, are programmed into the computer. From these he will get random-choice sentences. He expects to end up with enough meaningful sentences to make a movie script.

McDermott said he is using a computer because it "selects words in an unprejudiced and random fashion. Hopefully with the computer's help, I will be able to discover new imagery and film structures, which I would never be capable of finding on my own," he said.

8,000 Miles Apart, But Computers Still Move Oil Shipments

NEW YORK – Daily exchanges of information between computers here and in Saudi Arabia – 8,000 miles away – are helping speed daily shipments of over three million barrels of oil and petroleum products to destinations throughout the world.

The Arabian American Oil Co., (Aramco) has developed a computer-based system to handle the complex tasks of production planning, projecting and updating inventory for different products and to assist in coordinating shipments in and out of world ports.

The system uses IBM 1130 computers at New York City and Dhahran, Aramco's headquarters, and Ras Tanura, the company's refining and marine terminal complex on Saudi Arabia's Persian Gulf Coast.

J. Harry Wolf, Jr., Aramco Systems engineer, New York, said the computer system, Production and Offtake Planning, was designed to enable planners in New York and overseas to work with a common data base.

System Watchdogs Hospital Equipment

ROYAL OAK, Mich. – The job of watchdogging thousands of pieces of life-supporting equipment at Beaumont Hospital here has been assigned to a computer.

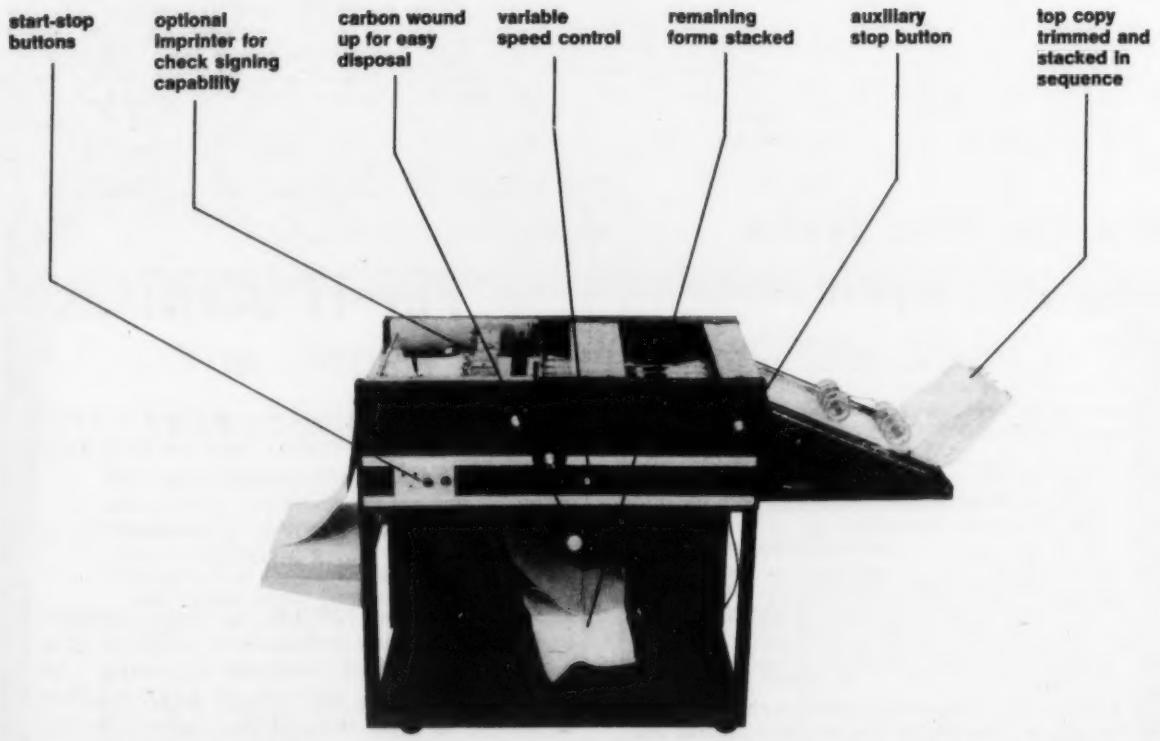
A Burroughs B2500 system keeps track of maintenance schedules for such items as air conditioning fan motors, electric beds, and portable transistorized patient monitoring equipment.

"The application of sophisticated computer technology to the maintenance of important hospital equipment is long overdue," said Joseph Morgan, assistant director.

Operating room equipment, medical testing devices, laboratory equipment, mechanical systems and other types of machines are filed in the B2500's memory.

When a piece of equipment is to be inspected, a maintenance ticket is printed out by the computer, reducing the number of unexpected breakdowns.

New Tab one-pass Burster/ Decollator/Imprinter/ Slitter/Stacker.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The new 2380 Burster from Tab combines the operations of several machines to save you time and money. We call it **Multi-processing:**

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TAB PRODUCTS CO.

Adapso to Focus on Management

NEW YORK – The 31st Management Conference of the Association of Data Processing Service Organization (Adapso) will be held at the Mountain Shadows Hotel, Feb. 18-19, in Phoenix, Ariz., and will focus on a return to the basics of operating a data center.

Also included in the program will be attention to involvement in new profit centers such as software development and data facility management.

The objectives of this program will be addressed through panel discussions, platform presentations and workshop with members, associate members, and interested parties participating.

Specific subjects will include budgeting and planning; pricing policies; marketing techniques; software as a profit center; management of a facilities operation; contract preparation; job cost accounting; and personnel selection and evaluation.

The meeting will be chaired by L.A. Welke, president, International Computer Programs, Inc.

Bernard Goldstein, Adapso president, will chair the business portion of the conference.

Further information may be obtained from: Adapso, 551 Fifth Ave., New York, N.Y. 10017.

AMA Plans Finance Conference

NEW YORK – The first Annual International Finance Conference scheduled by the American Management Association Feb. 22-24 will key on the opportunities for U.S. business overseas in the '70s.

The conference will be held at the Waldorf-Astoria Hotel.

Special features will spotlight the prospects for reform of the International Monetary System, how to deal with the danger of expropriation, how to cope with foreign exchange risks in an unstable foreign currency environment, and will take a look at future interest rates and inflationary trends in the major economies.

NMA to Examine Standards

WASHINGTON, D.C. – A examination of the possible impact of industry-wide standards on equipment design and compatibility and a special problem-solving hour featuring a panel of distinguished consultants will share the spotlight on the final day of the National Microfilm Association's annual mid-winter meeting Feb. 10-12 at the Fountainebleu Motor Hotel in New Orleans.

The discussion of standards is expected to focus attention on likely effects of industry-wide application of standards as seen from the viewpoints of manufacturers and users.

Registration fee for NMA member is $35 and for others $55. For additional information contact Frederick L. Williford, National Microfilm Association, 8728 Colesville Road, Silver Spring, Md. 20910.

Study Explains Junior College DP

WASHINGTON, D.C. – Business applications programmer, computer operator and unit record operator are the three types of DP occupations for which junior colleges can best prepare students to seek work on an entry-level basis.

This is one of the curriculum recommendations of the National Advisory Committee on Data Processing of the American Association of Junior Colleges.

Education

The recommendations are included in *The Data Processing Curriculum.*

A two-year junior college program, the committee says, is entirely adequate to train a business applications programmer and a one-year program is appropriate for computer and peripheral equipment operators.

A number of computer-oriented occupations normally require a four-year academic program: systems software programmer, scientific applications programmer, and business systems analyst/designer. The committee feels that the depth and breadth of subjects required for preparation in these fields cannot be provided in a two-year program.

In the view of the committee, "Every student pursuing a business-related programming study should have some exposure to the computer and the resultant social and economic impact of its widespread utilization . . . A business curriculum should include, minimally, an introductory course to the field of data processing."

COMPUTERWORLD

societies/user groups

Wema Names 1st Non-Californian President

LOS ANGELES – The electronic manufacturing association of Wema has elected Dr. R.C. Mercure Jr. president, the first to be honored from outside California.

A group vice-president of the Ball Corp., Boulder, Colo., Mercure will be 1971 president of an association whose membership now includes 648 electronic and information technology firms in 11 western states.

He succeeds Harold R. Frank, president of Applied Magnetics Corp., Santa Barbara, Calif.

Elected secretary of the association was Lester L. Kilpatrick, president of California Computer Products, Anaheim, Calif. Herbert M. Dwight Jr., president of Spectra-Physics, Inc., Mountain View, Calif., was named secretary-treasurer.

Other Elections

Rober L. Mills has accepted appointment as chairman of the ACM Professional Standards and Practices Committee. Mills is former chairman of the Los Angeles Chapter.

Mills is affiliated with the TRW Systems Group.

And the Computer Operations Management Association of New York has elected Terrence Smith as its new president for 1971.

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This Bunker-Ramo data terminal system gives instant access to traffic ticket records of 1,800,000 drivers.

Bunker-Ramo, with more on-line/real-time experience than anyone else, provides the data entry and retrieval system for the Motor Vehicle Department of one of the most populous states.

The present headquarter's system is being expanded, with a new CDC computer, and will be remoted to seven regional offices with Bunker-Ramo Series 2200 CRT (Cathode Ray Tube) terminals. Some are located right on the judges' benches in municipal courts, for use after trial and before sentencing to determine the violator's past driving record.

What started as a headquarters convenience is expanding to a statewide law-enforcement tool.

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If this is just the ticket for you, contact Mr. Guy Mallery, Vice President, Business & Industry Division, The Bunker-Ramo Corporation, 445 Fairfield Avenue, Stamford, Connecticut 06904. Phone (203) 348-4291.

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Journal Announced

WASHINGTON, D.C. – A new reference journal, *Language and Automation*, has been designed as a quarterly, annotated bibliography of the literature dealing with the interfaces of linguistics, computation, information science and related fields including theoretical linguistics, mechanical translation, machine-aided language learning, and man-machine communication.

It is prepared at the Center for Applied Linguistics by the Language Information Network and Clearinghouse System (Lincs) with the cooperation of institutions in Canada, Czechoslovakia, France, Germany, Israel, Japan, and the U.S. Among the coordinators are Martin Kay, Warren Plath, and Bernard Vauquois.

Subscription is $7 a year for individuals, $10 for institutions.

Student-College Match Grows Popular

By Ann Nolan
CW Staff Writer

EVANSTON, Ill. – There are various ways for a student to search for the college of his choice – counselors, catalogs, and visits to college admissions directors – but many are finding the fastest method to be with the aid of a computer.

Several student-college computer matching companies exist in the country today but the College Admissions Center of the Association of College Admissions Counselors (Acac) has been in business since 1958. The matching is done by an IBM 360/30 using the facilities of the Chicago Tabulating Service which has been working with Acac since the company started in business.

Acac, an organization of about 2,200 colleges, universities, and secondary schools, established the nonprofit College Admissions Center to act as a link between prospective students and member colleges and universitites.

It was originally intended to aid those students who were having difficulty getting into college. Through the years, it has expanded its service to include helping transfer students and juniors in high school choose their colleges.

The purpose of the center is not to

Education

counsel the student in his college choice but to act as a disseminator of information. Neither does it interview, test, or advise students.

About 5,000 students from all over the world apply to the center in a year, and approximately 60% have been aided in their college choice by the center. A student fills out an information form which includes personal data, interests, scholastic record, and a recommendation by his high school counselor.

The center then sends a monthly list of candidates to the member colleges, which number over 300, consisting of a brief resume of pertinent admission information. The colleges and universities respond to those students whose resumes indicate that they might be successful students at the school.

The center does not guarantee admission to any college since that decision is strictly up to the college. The cost to the student for the service is $20.

Member colleges are located throughout the U.S. and include large independent and state universities, small colleges, coeducational institutions, men's and women's colleges, public and private institutions, junior colleges, nonsectarian and church-related institutions.

According to Mrs. Patsy Hensley, acting director of the center, there are no immediate plans to aid graduate students. "For the present," she said, "we plan to continue a search program for students seeking admission into undergraduate schools."

Merc Gets Grant From U.S. Steel

LANCASTER, Pa. – The United States Steel Foundation has awarded a $10,000 grant to the Middle Atlantic Educational and Research Center (Merc), a regional non-profit time-sharing computer system for educational institutions.

Robert J. Gunder, manager of development and advanced planning for Merc, said the funds will be used to support computer software packages to improve the efficiency of college and university alumni fund-raising programs.

Merc is set up as a consortium involving five colleges and six secondary school districts.

Members are Conestoga Valley School District, Franklin and Marshall College, Juniata College, Lebanon Valley College, Manheim Township School District, Mercersburg Academy, Messiah College, Palmyra School District, Parkland School District, Valley Forge Academy, and Wilson College.

Data Preparation Costs Seen Rising

MIAMI BEACH – While the average cost of computing has plummeted to a tiny fraction of what it was a decade ago, the cost of data preparation has been rising 5% to 7% annually during the same period.

James J. Barrett, president of Malt Keyboard Dynamics, Inc., made this observation in an address before the annual meeting of the Graphic Communications Computer Association of Printing Industries of America.

He also made reference to the variety of data terminal devices in use today, saying the problem is widespread.

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CRTs Aid Researchers

WASHINGTON, D.C. – Major ingredients of the well-known information explosion are the summaries of some 100,000 private and governmental research projects being conducted in the U.S. today.

For the sole purpose of collecting and disseminating this data, an organization called the Science Information Exchange (SIE), in Washington, D.C., has established one of the nation's largest on-line data banks (400 million characters of storage).

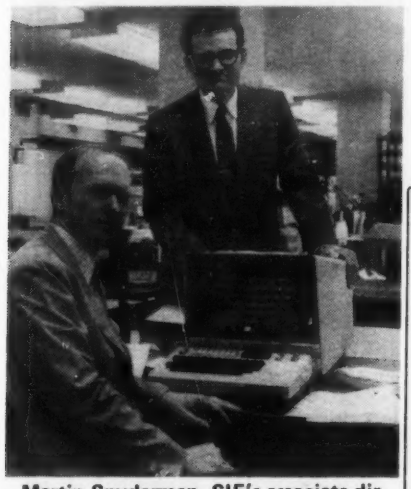
Now, to economically process the huge quantity of data involved, the SIE has installed a battery of 12 Bunker-Ramo CRTs.

SIE, a non-profit organization founded in 1949 and under the aegis of the Smithsonian Institution since 1953, began to computerize its library-like operations in the late 1950s. With the aid of modern-day electronic devices, the SIE indexes, stores and disseminates research project information.

The inquirer need only call or write the Exchange stating his question. The SIE staff will properly code the inquiry and feed it into the computer. Within days he will receive a computer printout of all the project summaries covering his field of interest.

The system consists of an IBM 360/40 central processing unit with a 2.5 μsec memory cycle, one printer with maximum speed of 1,100 line/min, two disk units and four tape drives, one on-line data cell consisting of 10 sections of 40 million-byte capacity each, and the 12 new Bunker-Ramo 2206/17 video display terminals mentioned earlier.

The CRT terminals are connected to a Bunker-Ramo 2222 multistation control unit which currently has six buffers of the full nine buffer capacity. Since each of the 480 character terminals only require a half-buffer the system may be expanded from 12 to 18 terminals.



Martin Snyderman, SIE's associate director and chief of data processing, seated at one of the new Bunker-Ramo CRTs with Bernard Hunt, deputy chief of data processing.

A special light pen is used to call up instantaneous CRT displays of flight patterns and other data concerning 747 flights from the West Coast to Hawaii.

Mini Tests Air Traffic Program

FREMONT, Calif. – Systems from Varian Data Machines and Information Displays, Inc. are easing the strain on FAA air traffic controllers here and providing improved transoceanic monitoring of Hawaii-bound 747s and other aircraft.

In a test program being conducted by the FAA, Aeronautical Radio, Inc. and several airlines, a new low-cost graphic display system called Idiiom (Information Displays, Inc.'s Input/Output Machine) uses a Varian 620/i minicomputer for real-time tracking and continuous display of specially equipped aircraft along the oceanic air traffic control routes.

Under the new technique, the flight plan submitted by the aircraft's captain is entered into the Idiiom system's programmable memory.

Another feature of the Idiiom system is that if two aircraft on the display are on an apparent collision course, the 620/i originates a warning signal and causes the conflicting aircrafts' data blocks to blink.

Project Probes Pollution Threat

STATE COLLEGE, Pa. – Whether or not the greater incidence of colds or other respiratory ailments among people who breathe polluted air is traceable to air pollution is the basis of a computerized research project under way at Penn State University. The three-year project is funded by a National Institute of Health grant.

Air pollution also may cause lung tumors and a destruction of the protective lining of the lungs. These and other effects of air pollution are being explored here by researchers using an IBM 360/67.

Dr. Rodney A. Rhoades, assistant professor of applied physiology and the principal investigator for the Penn State project, said that one year's research already has uncovered results that will be useful in establishing new air pollution control criteria.

To study the effects of air pollution, four test colonies of laboratory animals are exposed to controlled environments and examined medically.

HIIS Graduate Is a First

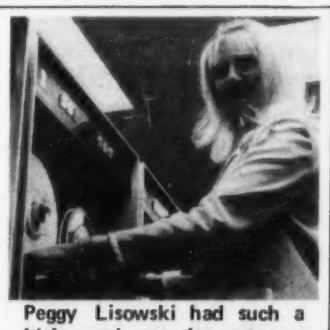
By CW Midwest Bureau

CHICAGO – The Honeywell Institute of Information Sciences (HIIS) has just graduated its first post-graduate class in computer science, and with it, the first "scholarship" student in HIIS history, according to Richard Soucie, HIIS manager here.

"Our aptitude test," Soucie said, "is a rather stiff one developed for us by science research associates. We took one look at one applicant's test results and were amazed. One girl, a Peggy Lisowski, attained a remarkable score, one considerably above average."

Later, Soucie explained, when it was discovered that Miss Lisowski would be unable to attend the institute due to a lack of funds for tuition, Soucie made arrangements for her "scholarship." "When I thought of that talent going to waste, I had to do something about it," he said. "And she didn't disappoint me," he added, "she graduated with an 'honors certificate,' this school's first."

Miss Lisowski, a 22-year-old Loyola University graduate with a psychology major, lives in suburban Maywood.



Peggy Lisowski had such a high mark on the entrance exam to the Honeywell Institute in Chicago that she received the first scholarship in HIIS history.

DP Reaches Essex County

SOUTH ORANGE, N.J. – The computer age has dawned in Essex County high schools with the prospect that within five years computers will be as widespread as blackboards in math and science classes.

Half of the 18 public high schools in suburban Essex have introduced computers into their curricula. "You can't ignore modern technology," declared Peter Tenewitz, chairman of the math department at Columbia High School. "Any student who wants to take a math or science major in college, or who goes into business, will have to know something about the use of computers."

The program at Columbia started about a year and a half ago with an IBM 1620. The students' skill soon outgrew it and Columbia was impressed enough with its potential to rent an IBM 1130.

There are five computer classes at present. Teachers are "rotated" to teach the course.

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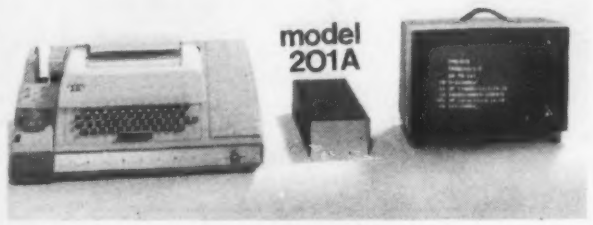

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December 30, 1970 – January 6, 1971

CI Notes

Interdata Mini Expected

OCEANPORT, N.J. – Look for Interdata to introduce a new minicomputer with an integrated circuit memory early next year – entering the race with DEC which is also expected to go the semiconductor route. Interdata recently cut the prices on its Model 4 and 5 computers with 8K memory by between $1,500 and $2,000 to become "more competitive."

The firm attributes the price cuts to a price reduction in the core memory, which the firm is now stringing in Barbados, accounting for a 50% reduction in direct labor costs. The price of an 8K memory dropped from $4,800 to $3,200.

Interactive CRT Growth Seen

LOS ALTOS, Calif. – Sale of interactive CRT terminals is expected to grow from a level of $65 million this year to $190 million in 1975, according to Creative Strategies, Inc.

The firm predicts that the number of installed terminals will increase from 52,000 units in 1969 to 258,000 units by 1975, when its installed value is expected to total over $1 billion.

Nearly two-thirds of the market, the firm said, will be accounted for by seven dominant users, which include financial and brokerage, airline reservations, other reservations (hotel, auto, etc.), insurance, military and government, time-sharing, and keypunch replacement.

Swedish Board Picks Key-to-Tape

STOCKHOLM, Sweden – The Swedish National Board for Civic Registration and Tax Collection and the Swedish Office of Organization and Management has investigated the cost of key-to-tape compared to punch cards and decided that the punched cards methods should be replaced by key-to-tape.

The present 373 keypunches used by the Swedish Tax Authorities are, as a result, being replaced by 170 Mohawk Data Systems Data Recorders supplied through SAAB-Scania A/B, Datasaab, the MDS distributor in Sweden, during the first quarter of 1971. The order is valued at approximately $2.5 million.

Supershorts

Diablo Systems, Inc., has signed an agreement with Hokushin Electric Works, Ltd., of Tokyo, Japan, licensing Hokushin as exclusive Asian manufacturer of Diablo Series 30 disk drives. Hokushin expects to start delivery of Series 30 drives of its own manufacture during 1971.

Wang Computer Products, Inc., has reported that the backlog of orders for its Mod 7, Mod 8, and Mod 10 tape drives had reached $3.6-million by the end of November 1969.

Infoton, Inc. and MAI Canada, Ltd. have agreed to a distributor relationship for the sale and servicing of Infoton's series of Vista CRTs throughout Canada.

McDonnell Douglas Automation Co. has been selected by the Federal Reserve Board to analyze its computer operations in Washington, D.C.

Research Firms Agree

Domestic DP Shipments Dropped 10%

By E. Drake Lundell, Jr.
CW Computer Industry Editor

BOSTON – The final figures are in and – believe it or not – the prognosticators that follow the computer industry agree that the domestic shipments of computer equipment were off about 10% in 1970 [CW, Oct. 28].

But that's about the only figure that two of the largest research firms – Arthur D. Little, Inc. and International Data Corp. – can agree on even though they agree in principle about the future of the industry.

Earlier this year the two had been at loggerheads over the decline in computer shipments, with IDC predicting an 8% to 10% drop – as it does now – and ADL saying that the drop would run between 27% and 36% of its estimates for 1969.

One other area of agreement is on total industry revenues, which both predict will be up – IDC says 15% to 17%, while ADL would not release concrete figures.

In preliminary figures for the year, IDC says that domestic shipments of new computer equipment were $4.4 billion in 1970, down from the $4.8 billion registered in 1969.

ADL has revised its previous $3.5 billion estimate of 1970 shipments upward to $5 billion, which means a drop of only 10% as compared with the projected drop of 36%.

(The accompanying box shows IDC's estimates of shipments by manufacturer.)

Because most computer systems are rented, the reduced level of shipments will still result in a 15% to 16% increase in the value of installed computers from $21.9 billion in 1969 to around $25.4 billion in 1970, according to Walter E. Misdom, IDC's vice-president for industry analysis.

Frederick G. Withington of ADL said that the return rate of computer systems was low in 1970, so that the value of shipments was close to the additional value of the installed base, but would not give concrete figures.

ADL says that completely new computer installations accounted for $3.5 billion in shipments, while additions to already installed systems accounted for the other $1.5 billion in shipments in 1970.

The foreign markets for U.S. manufacturers were strong in 1970, according to the firms, with IDC estimating shipments of $2.9 billion and ADL reporting shipment value of $2.4 billion overseas.

Overall, IDC reports total shipments of U.S. manufacturers at $7.3 billion, up 4% over 1969. Total shipments seen by ADL are $7.4 billion, but Withington says that this was "slightly" down from the 1969 estimates.

Dedicated application computers and minicomputers showed a high growth rate, according to the firms, despite failures among some of the manufacturers. IDC estimates that mini shipments reached $570 million, a 30% to 35% increase over 1969.

Most of the growth in this area came overseas, the firm said, where deliveries were up 40% to 45%, while domestic shipments increased only 15% to 20%.

While ADL declined "at this time" to break down the various market segments of the industry, IDC gave the following projections of the business.

Independent peripheral manufacturers will have an estimated 30% to 32% increase in shipments during 1970 to about $570 million, and are expected to see growth in 1971 estimated at 25% to 30%.

The third-party leasing industry ceased making major new purchases during 1970, dropping from an estimated $1 billion in new purchases in 1968, to $500 million in 1969, and about $150 million in 1970. Its main concern for 1971-73 is the rate of renewals on short-term leases.

	Value New Shipments 1970 ($ millions)	% 1970 Shipments
IBM	$ 4,775	65.4%
Honeywell/GE	650	8.9
Burroughs	470	6.4
Univac	390	5.3
NCR	310	4.3
RCA	240	3.3
Control Data	220	3.0
DEC	100	1.4
XDS	60	0.8
Others	90	1.2
Totals	$ 7,305	100%

The firms differ sharply on their projections for the industry in 1971, with IDC optimistic and ADL pessimistic.

ADL's Withington said that the firm "doesn't think 1971 will be much better than 1970."

C. Oakley Mertz, director of IDC's corporate planning service, said that recent studies indicated that EDP budgets at user sites in the U.S. will show sizable increases in 1971.

Computer users at smaller firms will show a delayed reaction, but should begin to sharply increase their expenditure level for EDP products and services by mid-71, Mertz forecasts.

Overall, IDC expects that computer equipment manufacturers will experience a 15% to 17% growth in revenues during 1971, while firms offering computer software and services will enjoy a 23% to 25% increase in revenues next year.

Independent Disk Drive Firms Squirm Over Addition of 2319

By E. Drake Lundell Jr.
CW Computer Industry Editor

NEW YORK – The independent disk drive manufacturers are squirming over the IBM announcement of the 2319 drive for the System 360, but haven't yet decided on a course of action.

None of the major independents contacted by CW wished to be quoted directly, but they generally echoed the sentiments of one who said: "They've (IBM) certainly dropped the umbrella on us."

The 2319 drive, originally announced for the 370/145 but then made compatible with almost the entire 360 line of computers, is generally priced around 10% below the price that independents charge for the 2314-compatible disk units.

Richard Caveney, of the Computer Peripheral Manufacturers Association, said that the decision indicates that IBM is attacking the entire computer market to offset the effect of slowing sales.

He said that IBM was beginning the hard sell and that the independents would "have to play their ballgame."

Apparently, the independents feel that there are two options open to them – either drop the prices on their present 2314 replacement units or develop a lower cost 2319 system.

However, all of the firms are treading lightly in the development of new units, since IBM in two recent suits (against Memorex and an employee of Information Storage Systems) indicates that it will fight what it feels are violations of trade secrets.

In fact, one observer, noting the timing (the suits came just before the 2319 announcement) said he felt that the court actions might have been aimed at scaring some of the independents out of early announcements in this area.

One firm was optimistic, indicating that it did not think that the announcement "will bother us at all." The source indicated that the firm was already working on lower-priced disk units, but would not make any disclosures.

Most of the independents are presently "assessing" the announcement, most industry sources said, and a rash of product releases is seen for the first of the year, but no one's talking now.

It is clear, however, that the independents will be making some moves in this area to maintain their price advantage over the leader.

Up until the announcement, 1970 had been a banner year for the independent manufacturers, some industry sources said.

Computer '70 Finds Friends in Japan

WASHINGTON, D.C. – The booming Japanese market for U.S.-made computer equipment was highlighted by the recent Department of Commerce-sponsored Computer '70 show in Tokyo.

With final figures now complete, it appears that U.S. firms expect to do more than $100 million in business in the next two years through contacts made at the show.

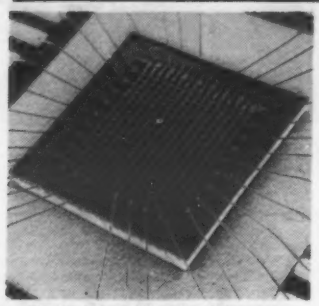
The show – in marked contrast to domestic computer exposition last year – saw Japanese professionals waiting in line for as long as two hours to view the 63 American firms exhibiting $12 million worth of equipment.

The firms posted direct floor sales of over $2.3 million and forecast another $41.6 million in new exports within the first year.

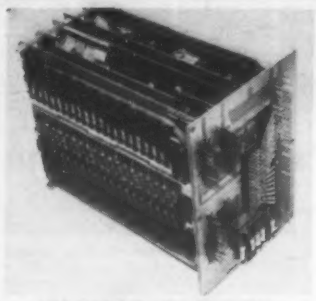
At the show Viatron's floor business totaled $700,000, and the firm estimated new export business in Japan in a year at $5 million.

Data Products International, Inc. Woodland Hills, Calif., showing a line printer with communications interface and a card reader, sold $7,000 worth of equipment off the floor and predicted $150,000 in business in Japan during the year following the show.

Memorex Corp., of Santa Clara, exhibiting a communications terminal, computer output microfilm printer, and disk drives, posted $100,000 worth of floor sales and estimated that additional business in Japan in a year could reach $2 million.



ECD's Read-Mostly Memory



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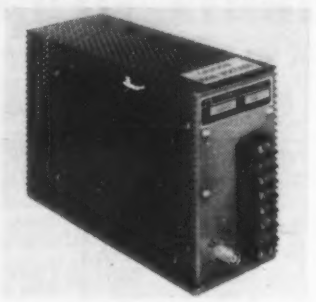

Bertan's 602 Power Supply

ECD's Electrically Alterable Memory Consists of Amorphous Semiconductors

TROY, Mich. – A 256-bit Read-Mostly Memory (RMM) that consists of silicon and amorphous semiconductors combined on a 116 by 126 mil monolithic chip is now being produced in commercial quantities by Energy Conversion Devices, Inc.

Circuit of the RM-256 is a 16 by 16 matrix with a diode-isolated Ovonic Memory Switch (OMS) at each cross-point. The two-terminal OMSs are, in essence, electrically alterable bistable resistors that can be switched between their high resistance (300 kΩ) and low resistance (500 Ω) states by application of a controlled current pulse.

The OMSs can remain in either state indefinitely – even if power is removed from the circuit.

Bistability of the OMS is achieved by use of an amorphous semiconductor material that can exist in either of two phases or conditions of short-range atomic order. In its disordered phase, the material exhibits high resistance; in its more-ordered phase, the material has low resistance. Switching between the two phases is reversible and – in the RM-256 – is achieved by applying electrical energy to the Ovonic material and controlling the energy-time profile.

The RM-256 is being offered initially at $250 each in quantities of 1-9. Other quantity prices are $150 each for 10-99 and $100 each for 100 or more.

New OEM Products

Nemonic Shows Memory Systems

DENVER, Colo. – Nemonic Data Systems has made available a family of plated wire memory systems.

Speeds in the NM-5000 Series are read access 150 nsec, read time 250 nsec, and write time 500 nsec. The storage element is a magnetic thin film plated on 0.005-in.-diameter wire and the wire operates in the non-destructive readout (NDRO) mode. Maximum capacity of this family is 81,920 bits.

This series can be configured into systems consisting of 1K to 4K words by 8 to 40 bit/word.

A minimum system in this series is 1K by 8 while a maximum system is 2K by 40 or 4K by 20. These systems all use the same basic printed circuit boards.

The NM-5000 plated wire memory systems are priced from .035 cents to 15 cents/bit depending on quantity and word size.

Celco Offers Line Scan System

MAHWAH, N.J. – Celco is now offering a series of line scan systems that produce the necessary functions for electron beam control in most CRT line scan displays.

The LSS provides for deflection, focus, linearity correction, positioning and centering of the beam. Options include a sweep generator, phosphor protection and a high-speed vertical amplifier.

Although especially suited for fiber optic line scan CRTs, the LSS will be of value with high-speed non-impact printers, flying spot scanners, film readers and recorders, and other displays using line scan techniques, the firm claims.

Power Supply Available From Bertan

PLAINVIEW, N.Y. – Bertan Associates' new Model 602 High Voltage Power Supply, with up to 4.5 kVdc output, is designed to power photomultiplier tubes and CRT displays.

The 5-in. by 3-in. by 7.5 in. unit costs $265 and is available from stock. Bertan Associates is at 15 Newtown Rd.

15 char/sec Keyboard Pulse Switch

EDEN PRAIRIE, Minn. – TEC's P301 Keyboard Pulse Switch is a discrete pulse-generating switch, that provides data entry rates averaging 15 char/sec. The switch measures 2.02 in. overall including keytop and mounts on 3/4-in. centers.

TEC's P301 Series "N" key rollover feature allows any number of keys to be depressed sequentially without destroying continuity of data input.

Gold-plated beryllium copper contacts are rated at 0-32 Vdc, 250 mA contact resistance is 200 mΩ. The plunger accepts TEC or IBM Selectric Keytops which must be ordered separately.

TEC Inc, is at 6700 South Washington Ave.

Hughes Offers Ion-Implanted ROM

NEWPORT BEACH, Calif. – An ion-implanted read-only memory designed to be price-competitive with standard P-channel ROM devices, but providing faster access time, has been introduced by Hughes Aircraft Company's MOS division.

The IROM2560 is a monolithic 2,560-bit memory featuring an access time of 500 nsec. Applications include look-up tables, code conversions, display generation, computer microprogramming, and random logic synthesis.

The IROM2560 is priced at $29 in 100-lot quantities, and is available on 45-day delivery.

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Hard fact one. We've cornered the market. During 1970, Computerworld ran more than twice as many 7"x10" pages of software advertising than the next four leading computer publications combined.*

COMPUTERWORLD	509 pgs.
DATAMATION	85 pgs.
BUSINESS AUTOMATION	41¼ pgs.
COMPUTER DECISIONS	41 pgs.
MODERN DATA	28½ pgs.

*Figures compiled by Computerworld's Market Research Department through Nov., 1970.

Hard fact two. Computerworld has the highest all-paid circulation of any publication in the EDP field. More than 35,000 subscribers in all.

Hard fact three. Computerworld reaches the points of purchase at more than 20,000 computer installation sites. These are virtually all the sites which use outside software services.

Hard fact four. Computerworld offers the lowest cost per thousand of any computer publication. Our CPM is only $18.76 (calculated Nov., 1970).

Hard fact five. Even though our rates increase Jan. 1, 1971, we'll bill you at 1970 rates if you reserve your advertising space before Dec. 31, 1970.

Hard fact six. Closing for our Software Supplement is Jan. 8, 1971.

Topics to be covered in our Software Supplement.

- Differentiating packaged software 'tools,' including pre-compilers and cross-assemblers.
- Evaluating those 'tools' which can be used most effectively to improve or control operating capabilities.
- Analyzing the features of specialized languages or software building technology that the average user may have overlooked.
- Describing different systems software available to support the development of on-line, real-time applications.
- Reporting on systems measurement tools, including hardware monitors, process time accounting and program evaluators.
- Evaluating what type of installation can benefit most from this range of tools.

For more details about our Jan. 27 Software Supplement, contact the Computerworld representative nearest you.

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AMI/MOS devices made in the Orient are just like the custom parts produced in great volume by AMI in California, Mexico and Idaho. AMI means MOS, and MOS means metal oxide semi-conductors — the remarkable "new" parts that lower your product cost while raising reliability. At the same time, AMI/MOS parts reduce your capital investment requirement, and simplify your manufacturing process. Sound exotic? Not really. It is sensible, practical and profitable. Hop a jet and visit our Santa Clara headquarters for the whole story — or if you need a long trip, we can talk business at our Seoul plant — not too far from an exotic Korean temple.

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Make your big move with the H1648A. The fastest, most versatile system in the group. More employees will benefit from time-sharing. Yet they'll work with it in the same way as they do with our smaller systems.

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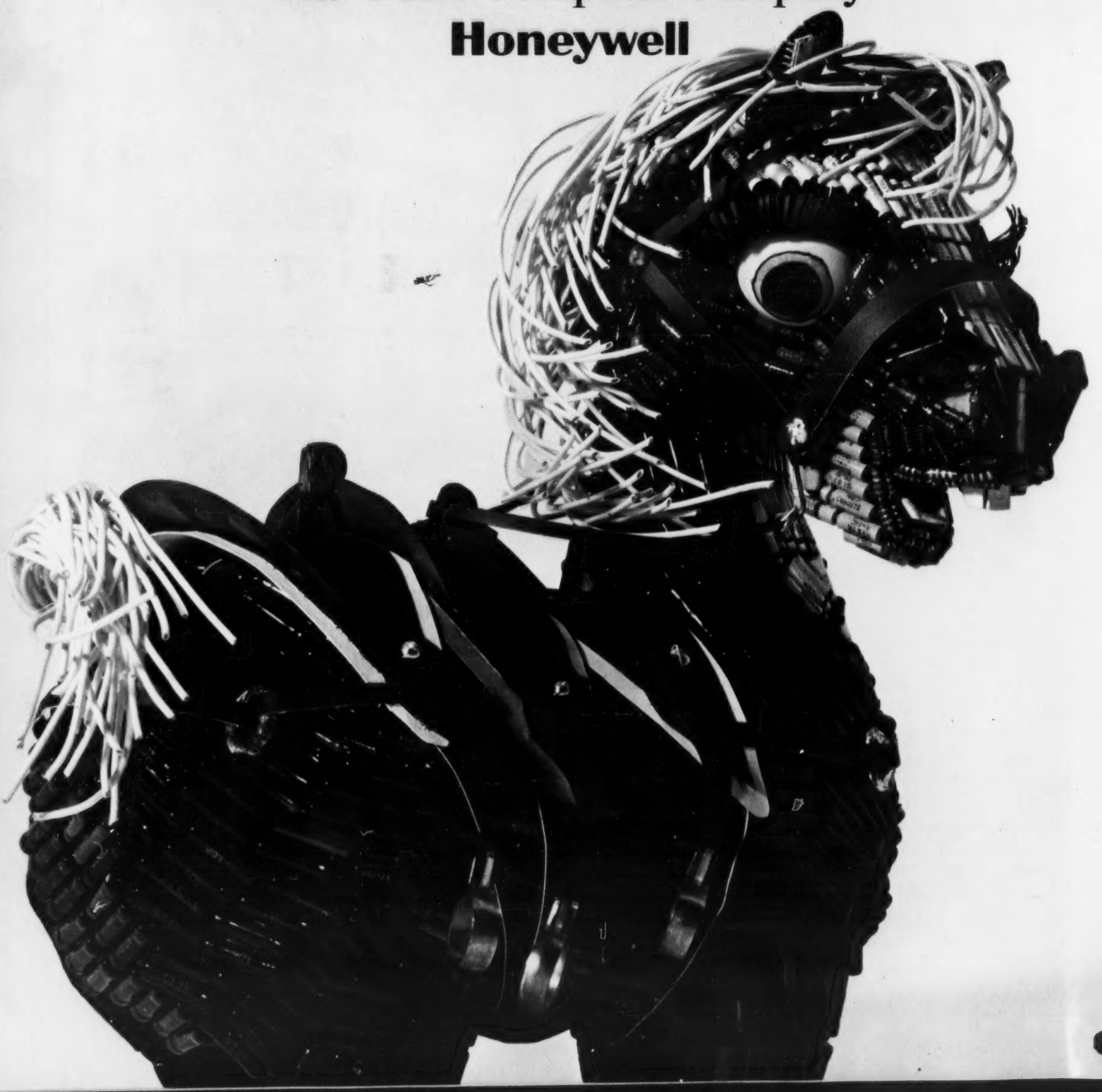


Approval Expected

Ecma Group Backs Phase-Encoded Cassette Standard

By Edward S. Kinney
Special to Computerworld

AMSTERDAM, The Netherlands – Formal recommendation of the first international standard for data interchange on computer-class magnetic cassette equipment has been completed here.

Phase encoding, which features high data density and self-clocking, was the recording format chosen by the standards committee of the European Computer Manufacturers Association (Ecma).

The committee recommended adoption of the phase encoding technique by Ecma members and has submitted the approved draft to both the American National Standards Institute (Ansi) and the Interional Standards Organization (ISO).

Most observers here believe the committee's work will be readily approved by the Ecma General Assembly when it meets next year and will ultimately be adopted by Ansi and ISO.

The completed document, entitled "Standard for Data Interchange When Using the Compact Cassette," is a result of a year's cooperative effort by 17 Ecma member companies from throughout Europe.

It formalizes a recommendation introduced to Ecma last May.

The Ecma companies active in the recommendation are Ampex, and NCR of the U.S.; ICL of the UK; Olivetti and Honeywell Information Systems of Italy; Siemens, Nixdorf, BASF, Olympia Ankerweke of Germany; IBM and Bull Berfort of France; Friden and Philips of Holland; Facit of Sweden, and ITT of Spain.

Standards Discussion

The standards discussion involved three principal areas:

- The mechnical-dimensional characteristics of the cassette, including such features as removable write enable plugs, side A/B visual and electrical identification and the end of tape (EOT)/beginning of tape (BOT) sense holes, and tape length of 282 ft minimum with 0.15 in. width.
- Magnetic characteristics of tape, including standard levels and definitions of drop in and drop out, storage and operating temperatures, etc.
- The information format to be used for universal data interchange.

The phase-encoded recording format selected is single track with 8-bit samples and a sum check character at the end of each block.

Side B of the cassette may be used for additional storage or alternately used as a redundant track, recording the same or complement of the information on side A.

Alternately, it may be used for special purposes such as clock, block identity or control as determinted by the parties exchanging data.

The proposed standard reflects the work of many companies and the "pooling of experience" gained from work with thousands of cassettes in the EDP environment.

Edward Kinney is tape product line manager for Ampex Corp.'s computer products division, Culver City, Calif.

DoD Keeps Tight Rein on Trade With Eastern Bloc Countries

By Phyllis Huggins
CW West Coast Bureau

WASHINGTON, D.C. – Computers are considered strategic weapons by the U.S. government and their export continues under strict controls.

The export program is enforced by the Department of Commerce which has to issue a license for every sale to an eastern bloc country. Commerce, however, says its policy is strongly determined by agencies of the Department of Defense, AEC and Nasa, with DoD having the strongest weight.

The stringency of this policy is evident in that during the first 10 months of 1970 only $7.2 million in sales of computers or parts were approved.

Requests Analyzed

A complex method is used to analyze requests for export license. It is necessary to have not only a complete description of the equipment but full information on the customer. This includes whether he does any military business, what the applications will be and, if any terminals are included, who will have access to them.

One particular factor considered is whether the ordered equipment is too large for the expected use. In addition, Commerce wants to be able to follow-up with the customer to keep track of any new uses.

Almost every year the matter of trade with the eastern bloc countries is opened for review. Several manufacturers have asked for easing of the restrictions.

IBM, in a statement to CW said: "... IBM's trade with Eastern European nations began during the previous administration, which encouraged the exchange of non-strategic goods with these countries as a practice of national interest.

"From the outset, under the present and preceding administrations, IBM has conducted such trade in accordance with ex?licit controls: we make no shipments of IBM equipment without the express approval of the U.S. Government, or without compliance with the specific government regulations on exports of goods to Eastern Europe."

Lack of Control

Wade Holland, Rand Corp., pointed out that control is not possible when a purchaser of U.S. equipment sells it to someone in the eastern bloc.

As an example, he said, IBM was thunderstruck when a party in Czechoslovakia requested membership in Share (IBM's large-scale scientific users organization) since it had a 7090.

Sales made by British manufacturers are putting pressure on current policy. ICL recently made a multimillion dollar sale to the USSR that is considered the first breakthrough.

Holland said that Russian scientists are very capable. They can make prototypes but the hold-up has been one of getting them into production. He also noted that even if restrictions were eased, the eastern bloc faces the problem of limited hard cash.

Raytheon, Hyperion Land FAA Contracts For Traffic Control

WASHINGTON, D.C. – The award of two contracts totalling $1.2 million for equipment and services related to the continuing program for automating the Federal Aviation Administration's enroute air traffic control system have been reported by Secretary of Transportation John A. Volpe.

The contracts were awarded to the Raytheon Co. of Sudbury, Mass., and Hyperion Industries Corp. of Watertown, Mass.

Raytheon was awarded $707,615 for installation, checkout and maintenance of display components for use with the IBM Display Channel Processing Equipment at FAA's National Aviation Facilities Experimental Center (Nafec), Atlantic City, N.J.

Hyperion was awarded $500,000 for spare power supply parts and modules for common radar digitizer installations.

Display System Contracts Awarded to Librascope

GLENDALE, Calif. – Librascope Division of the Singer Co. has been awarded a contract for development of a large-screen laser projection system by the U.S. Army Electronics Command at Fort Monmouth, N.J.

Characteristics of the laser projection system permit display of computer-generated information on a large screen at variable distances with high brightness.

Such a Small World

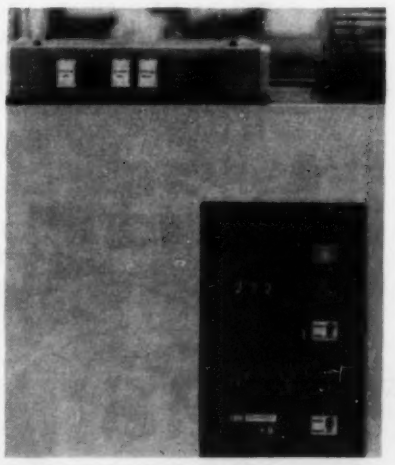
LONDON, England – British Overseas Airlines plans to make available to travelers a computerized information service listing British business contacts.

The traveler would fill out an information card before leaving the U.S., and would receive a printout of names and addresses related to his area of interest upon arriving in Britain.

Why install a ROYCO 205/108 memory protector after you suffer a head crash?

The time to detect and prevent hard input/output errors or a disastrous computer memory head crash is *before* it happens. Not after your on-line computer has lost its memory. After all, your random access memory devices must be reliable. The penalty is a costly computer failure.

But, memory devices do fail. Remember, they're extremely close tolerance devices made and used by people. That's where we come in.



ROYCO 205/108 Head Crash Prevention System in Service Protecting an IBM 2314 Disc Drive.

Our ROYCO Model 205/108 Head Crash Prevention System will detect and prevent head crashes and hard input/output errors. It's a memory protector. That's it's job.

How does it work? Simple. The density of particles manufactured inside the memory system is continuously monitored. Internal particle concentration caused by aerodynamically unstable read/write heads, warped or damaged discs, edge loading or other malfunctions that affect head/memory surface operating tolerances is detected. Before it becomes critical. Before a head crash can occur!

The ROYCO Model 205/108 memory protector gives operators audible/visual warning and automatically retracts the heads if desired. To prevent hardware and data destruction. To avoid hard input/output errors. To hold computer downtime *down*.

That's positive protection. That's what the ROYCO 205/108 memory protector is all about. Besides at $49.50 a month you can't afford to be without it.

Write us for full details. We're compatible with most memory systems in use today. Or call us collect. The memory protector is available now.

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Phase II Computer Installed at TAC AFB in Arkansas

DETROIT – A phase of the U.S. Air Force program to automate worldwide bases has been completed with the installation of a Burroughs B3500 computer system at Little Rock AFB, Ark., the last of 19 Tactical Air Command (TAC) posts to receive B3500s.

The installation marks the 77th B3500 computer delivered to the Air Force since 1968 under the once controversial, $60 million Phase II Base Level Data Automation Standardization Program, which calls for the installation of 127 such systems by mid-1972.

Award of the Phase II contract to Burroughs Corp. was authorized by the Air Force in 1967 after considering competitive bids.

The Air Force originally awarded the contract to IBM but was over-ruled by the General Services Administration, who ordered the bidding reopened. Burroughs landed the huge pact on the second round.

System 3/6 Finds Home

Units of the first IBM System/3 Model 6 to be installed are rolled into the plant of SI Handling Systems, Inc., Easton, Pa. The system will initially be used to process the firm's 300-man payroll, but in the future the system will be used to size equipment and simulate operation of the company's automated lines of handling systems.

Orders and Installations

Univac has announced the following new orders and installations of its 9000 series of computers to be used for general accounting purposes: 9200 systems by Hunkin Conkey Co., Cleveland; St. Thomas Hospital, Akron, Ohio; Robertson Heating Supply Co., Alliance, Ohio; Redditch Development Corp., UK, and Hinkley Urban District Council, UK.

Also 9200-11 systems by Value House, Lewiston, Me., and Yokohamakita Cooperative in Japan; 9300 systems by Dynasty Data Processing, Los Angeles; and T.I. Group Services, Aldridge, Staffordshire, UK; a 9300-11 system by Ashigara Cooperative in Japan; and a 9400 system by the London branch of Manufacturers Hanover Trust Bank.

Innsbruck University, Innsbruck, Austria, has ordered a Control Data 3300 computer system, valued at $800,000 to provide centralized computer services for the university's science, engineering, economics, philosophy and computer science departments.

A Digital Equipment Corp. PDP-15 computer has been installed at The Division of Food Preservation, North Ryde, New South Wales, Australia, to determine the characteristics of flavor components in foods, and their behavior during the preservation process.

Colonial Penn Group Data Corp. has installed two Honeywell Model 3200 computers at its headquarters in Philadelphia.

The University of Paris has ordered a Univac 1110 computer system, valued at over $2.5 million, for use in the scientific research program of the Laboratory for Theoretical Physics and High Energy.

Mauser Werke, Cologne, Germany, has ordered a Control Data 915 optical page reader system to handle business data processing applications.

More CI Notes

Varian Delivers 620/f Mini

IRVINE, Calif. – Varian Data Machines has delivered the first of its new 620/f minicomputers with a 750-nsec cycle time to Tymshare, Inc.

The arrival of the 8,192-word memory 620/f is the first of 36 Varian minicomputers scheduled for regular delivery under a recent $400,000 order from Tymshare. The 620/f is the successor to the 620/i.

ICL 4-72 Makes Debut

LONDON – The latest computer from ICL (International Computers Limited) offers an increase in performance of 10% to 20% over that of the 4-70 it replaces.

From a software point of view, the 4-72 appears identical to the 4-70. The faster performance of the new system is due to enhanced performance achieved through use of a faster memory with four times the capacity per cubicle and by integrating the memory with the central processor.

The CPU and I/O system can access different modules of 131K bytes simultaneously. Addresses are checked concurrently with processing. Storage cycle time is decreased from 900 nsec in the 4-70 to 520 nsec in the 4-72.

Stock Control System Bows

PARIS – A real-time invoicing and stock control system that automatically and simultaneously operates up to 10 printers from Alcatel, France, is based on a disk memory.

Providing a situation report at any instant on goods drawn from common stock by sale people or distributors, the system gives a stock record, carries out a daily inventory and memorizes data required for management purposes.

Additionally, customer payment can be recorded and a daybook kept. Returned goods can be noted.

Up to 10,000 customers or goods categories can be handled, the company said, and each printer can produce 150 invoice/hr.

Ampex Doubles Circuit Boards

BURLINGAME, Calif. – The Ampex Corp. printed circuit board manufacturing plant here has doubled its production of circuit boards from approximately 2,000 units to 4,000 units daily, resulting from the installation of $500,000 worth of new manufacturing equipment.

The Knock on the Door Isn't the Utility Meter Reader

By Robert Berryhill
Special to Computerworld

ONTARIO, Ohio – Computers are changing the housewife's image of the utility meter reader who interrupts her household chores when he goes through the house to check the meter in the basement.

That's what this Ohio community of 5,000 found out when it began a $3-million water distribution program. The village helped pioneer the application of computers to read water meters.

The computerized water meter system was developed by Neptune Meter Co. of New York City, a large supplier of liquid meters. The system has proven so successful that it is now being used in over 450 communities.

Although the system is compatible with all computers, Neptune is handling the computer billing for about 20 water utilities.

The meter man plugs a Neptune portable tape recorder into a special receptacle on the outside of the house. In three seconds, the account number and meter reading are translated into an electronic format and recorded on the tape cartridge.

The tape cartridge, with a capacity of about 600 meter readings, is sent to Neptune's data processing center.

The data terminal can convert to punched cards, punched tape or magnetic tape. Punched cards, used for processing utility data, are run through the IBM 360/30 for preliminary editing and through the sorter for account number sequence.

The cards with current meter readings are compared with the previous meter readings by the computer while the billings are prepared simultaneously for the computer printer.

The completed water bills are then mailed back to the village. The average turnaround time for the billing operation at Neptune is 48 hours.

The Neptune Meter Co. has developed another system for the automatic remote reading of water, gas and electric meters via telephone lines by a central computer.

A punched tape or card containing the telephone number of each customer is read by the command console. The console sends this information through a terminal which, via telephone lines, contacts the customer's telephone coupler.

The coupler bypasses the customer's handset so that it does not ring and sends the command console's signal to the transponder. This reads the meters and feeds the information back to the command console. Neptune is working with Bell Telephone Laboratories in a series of field tests of the system.

RCA IS Unit Names Donegan VP

CAMDEN, N.J. – RCA has changed the lineup at the top of its information systems division with an IBMer gaining the top spot. Another former IBM employee has gained the top marketing spot for the overall corporation.

L.E. Donegan Jr., who spent 18 years with IBM and Service Bureau Corp., will become vice-president, RCA Information Systems, effective Jan. 1, 1971. Donegan, who has served as division vice-president and general manager, RCA computer systems division, will succeed James R. Bradburn, who has resigned from RCA because of personal reasons. He will announce at a later date his plans in the communications industry.

Donegan will be proposed for election as an RCA corporate vice-president at the next board of directors meeting on Jan. 6. He will continue to head the computer systems division in addition to his overall responsibilities for information systems. Activities within information systems, in addition to computers, are memory products, magnetic products and graphic systems.

In addition, the appointment of James J. Johnson as vice-president, marketing, for RCA was announced by the firm. Johnson, who has been with IBM the past 15 years, will have staff responsibility for all RCA marketing activities. He will direct the corporate staff functions of advertising and corporate identification, marketing services, economic and marketing research and product and marketing planning.

Executive Corner

Other Moves

- Fairchild Camera & Instrument Corp., Mountain View, Calif., has named Eugene R. White a corporate vice-president and general manager of its systems technology division.
- Roger D. Miller has been promoted to vice-president, marketing, and David B. Karr has been named vice-president and controller of Leasepac Corp. of Cleveland.
- Delta Computer Systems of Atlanta has named John P. Bigger vice-president and secretary.
- Datatab, Inc. has appointed Charles Bartlett vice-president of its New York data center.
- The Institute for Scientific Information of Philadelphia has appointed Richard M. Harris vice-president, marketing.
- RCA's Computer Systems Division, Cherry Hill, N.J., has appointed E. Allen Henson division vice-president, conversion programs.
- Eugene J. Mascoli has been named a vice-president and director of marketing of Data Pathing, Inc., Sunnyvale, Calif.
- William Rein, Jr. has joined Terminal Communications, Raleigh, N.C., as vice-president of marketing.
- Data General Corp., Southboro, Mass., has announced the promotion of Harvey P. Newquist to the position of vice-president of manufacturing.
- Formscan, Inc., Pasadena, Calif., has announced the appointment of Harley D. Hancock as executive vice-president and Bob Stout as vice-president, operations.
- Harold Bergstein has joined TDL Systems Corp. of Los Angeles as vice-president of corporate communications.
- Computer Financial, Inc. of Los Angeles has elected William R. Lennartz chairman of the board and chief executive officer. Robert R. Russell has joined the company as president.

(And, as always, Freedom has its price.)

Two years ago, Electronic Memories announced its entry into the commercial systems business. Ah, the sweet taste of freedom! Freedom from military specs. Freedom to compete on an all-out free enterprise basis. Freedom to supply the major computer manufacturers with the world's best memory systems for high speed main frame applications.

Freedom for a few months. Then three major customers gave us more than twenty million dollars in commercial systems volume—and effectively took our little freedom ride right off the market.

Now, after many months, these same customers are starting to produce their own systems under our non-exclusive license agreements.

Freedom once more.

But—we are told by management—once again this freedom had better be short lived.

So, here we are. Ready to sell ourselves back into slavery. As initial inducement, here are some systems with almost immediate availability:

Our Nanomemory 2600 has 600 ns cycle time and 300 ns access time. Capacity is from 4K or 8K words by 36 bits to 16K words by 18 bits. Our Nanomemory 3650 has a full cycle time of 650 ns and an access time of 350 ns with modular capacities of 16K x 56, 32K x 40 or 64K x 20. The Nanomemory 4850 has an 850 ns cycle time and a 350 ns access time. Its module capacity ranges from 4K words by 8 bits to 32K words by 20 bits. All systems can be expanded to larger capacities by interconnecting modules.

We could go on to talk about the field replacement benefits that result from our unique plug-in stacks, our low power requirements and our low component count. Or customized core. Or stacks for virtually any digital storage application.

But you may have heard all that the last time we announced our freedom. What you haven't heard are some of our current delivery capabilities. Quoted in days rather than months.

Don't wait. Call. Write. Drive right over. It's Freedom Now.

Who knows about next month.

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this coupon.**

Nickels and Dimes

AT&T's earnings were down in the year ended Nov. 30 and this will cause it to "press for realistic repricing of our services," according to board chairman H.I. Romnes. Earnings for the year were $2.24 billion compared to $2.26 billion in 1969. Revenues were up in the period, however, from $15.5 billion to almost $16.9 billion.

$$$

University Computing Co. is now fully in the facilities management business. The firm has acquired an additional two million shares or 30.5% of Computer Technology Inc., increasing the UCC interest in CT to 71%. For the shares LTV Aerospace will receive a convertible $8.3 million note. If the SEC approves a stock offering, UCC can require conversion of the note into 280,000 shares of its common stock.

$$$

UCC also announced that it had completed the sale of Alcorn Combustion Co. and Bell Equipment Corp. to Omega-Alpha, Inc., which is touted as the "come-back" vehicle for one-time wonder boy, James Ling. This is part of the UCC plan to divest those activities that are not contributing to its concept of a computer utility – or to profits. UCC received debentures and warrants in Omega-Alpha.

$$$

Notice something different? The **New York Stock Exchange** is testing a stock ticker display system that flows from bottom to top instead of right to left as has been the tradition for 100 years. The new Stock/Com boards can display 3,600 char/min as opposed to the old systems that display 900 char/min. The new displays were built by Science Associates, Inc., Dallas.

$$$

Per share earnings for **United Utilities, Inc.** will be off about 10% in 1970 from the $1.29 operating profit reported for 1969. Overall, however, the president reported that earnings should be strong again in 1971 and that the company expects to be back on its objective trend line for earnings in 1972.

$$$

U.S. Time-Sharing, Inc. and Computer Network Corp. have announced an agreement in principle whereby Comnet acquires the computer business of U.S. Time-Sharing while the latter receives 600,000 shares of Comnet common stock, giving U.S. Time-Sharing ownership of approximately 60% of Comnet's outstanding shares. U.S. Time-Sharing will continue to operate as a separate company with interests in Comnet, Time-Sharing Terminals and Scientific Time-Sharing Corp.

Year-End Analysis

1970: the Year the Financial Bubble Burst

By Michael Merritt
CW Staff Writer

It was, of course, the year the bubble burst.

Lists of Chapter 11 proceedings replaced new registration statements as a symbol of the financial times. The great froth of speculation in stocks subsided, leaving more than a few fish gasping on the beach.

Facing a shrinking marketplace for the first time, the companies of the computer industry turned to a more vigorous, even vicious, competition to see who could survive.

Some didn't, even some of the biggest.

General Electric, the seventh largest industrial corporation in the U.S., discovered that it didn't have the resources to continue as a manufacturer of mainframes.

Honeywell bought the lion's share of GE's computer business and opened up a free-swinging scramble for the Number Two position in the industry, contending with Univac and newly inspired RCA for the honor of being second to IBM.

Financial

Even Number One, the model of the growth company, discovered that it could be bitten by the bear.

For the first time in recent history IBM had to report a declining quarter even though the decline was small. Domestic sales fell off sharply, and only international sales and advance bookings for the new 370s saved the year from becoming a rout.

The Giant Responds

IBM fought back, revealing some of the power it keeps well-hidden in easier times.

The 370 announcements once again called the tune for the other mainframe manufacturers.

An increase in maintenance costs on the 370 effectively put the third party lessors in a non-competitive position.

The firm also made a series of moves against the independent peripheral makers who had been taking an increasing share of IBM market. First the controller for the disk drives was included in the mainframe of the 370/145.

Then IBM instituted suits against two peripheral makers charging them with stealing trade secrets. Finally, as the year neared its end, IBM offered lower priced versions of its 2314 disk unit.

On the stock market side the prices of computer shares broke in the middle of January and continued dropping until the middle of August. CW's Composite Index fell from 118 to a low of 47 on Aug. 13. Since the end of summer stock prices have risen and dipped again, the Composite reading 53 on Dec. 10 and heading down.

It may be that Viatron is the best symbol of what has happened to the DP industry in the past year. Founded with trumpet calls, Viatron seemed to carry the promise of cheap, widespread use of data processing. There was something millennial to its message.

Passing through the rigors of 1970, however, the millennium receded, and more mundane problems of money, marketing, and manufacturing tarnished the golden dream.

As the year ends, Viatron, after running through $36 million of speculative money, is fending off creditors, trying to peddle an inflated inventory, and scrambling to find a measly $437,000 to pay the interest on its debentures.

Bankruptcy Proceedings Threatening Farrington

By Alan Drattell
CW Washington Bureau

SPRINGFIELD, Va. – It will be "business as usual as far as we are concerned," an executive of Farrington Manufacturing Co. told CW even though a Boston bank has asked the U.S. District Court here to reorganize the OCR manufacturer under Chapter 10 of the Bankruptcy Act.

Robert Easton, corporate secretary, acknowledged that Farrington had been threatened with bankruptcy proceedings by the New England Merchants National Bank of Boston because the Springfield company had defaulted on subordinated convertible debentures which were due last April 1. New England is trustee for $3.77 million in 5-1/2% subordinated notes.

In addition, the bank claims that Farrington defaulted Oct. 1 on interest payments on $12.5 million in 6% convertible subordinated notes, and on Nov. 1 on interest due on $9.97 million of 5-1/2% convertible debentures of its wholly owned subsidiary, Farrington Overseas Corp.

If the bank's petition to reorganize Farrington is allowed, the manufacturer's operation would continue under supervision of the court.

"Basically," Easton said, "people have known for some time we were in default. The filing by New England National was really a formality. To us, it doesn't mean any change in our operation for now, and we plan to follow through on our capitalization offer to our defaulted bondholders. We had planned on sending this offer out within 30 to 60 days. The formal filing may delay it or change it somewhat.

"We still plan to sell and service users of our OCR equipment."

It was also learned that Peter F. McCloskey, one-time president of Farrington who was replaced last April 1 by Edward J. Eggart and named chairman of the board, left the company formally in November. He had resigned his board chairmanship in September and his directorship two months later.

Farrington, one of the pioneer OCR manufacturing companies, has had only two profitable years in its corporate history, according to Easton, 1967 and 1968. In 1969, the company had a net loss of over $5.1 million. For the first six months of 1970, Farrington incurred a loss of $2.7 million.

If you work in any area of computer design or engineering . . . THIS IS YOUR SHOW!

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JANUARY 19, 20, 21, 1971
Anaheim Convention Center, California

The Computer Designer's Conference and Exhibition will concentrate ONLY on the design and engineering of computers, computer systems and peripherals—*not* on their user applications. Here, in an atmosphere carefully tailored to your interests you will learn what is really new in products and techniques. Here, you will have the rare opportunity to meet with approximately 15,000 of your colleagues from all walks of design and to exchange ideas and solutions to problems.

This unique show will consist of . . .

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11:30 AM - 6:00 PM
TECHNICAL SESSIONS:
Tuesday, Wednesday, Thursday
8:30 AM - 12:00
SPECIAL SEMINARS:
Tuesday, Wednesday
6:30 PM - 8:30 PM
PHONE:
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INDUSTRIAL & SCIENTIFIC CONFERENCE MANAGEMENT, INC.
222 W. Adams St. Chicago, Illinois 60606 A Corporation of the Kiver Organization
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Viatron Debenture Holders Form 'Protective' Group

BOSTON – Despite the after effects of the first Northeaster of the season, holders of $2.7 million worth of Viatron Computer Systems $15 million convertible debentures issue met here recently and formed an informal five-man "protective committee" to look at the activities of the troubled terminal maker.

The immediate cause for the meeting was Viatron's failure to pay the interest due on the debentures Dec. 1. The company has a 30-day grace period and was not technically in default until Dec. 31.

Viatron is attempting to induce debenture holders to turn in their notes for common stock. In a letter to the meeting – Viatron's only official presence there – management revealed that it was sending a letter to all debenture holders urging the change.

The note to the meeting also said that Viatron was not attending because the organizers "were unwilling to change the proposed agenda to accommodate us."

Sales Double

The letter did say, though, that Viatron's sales for the quarter ended Oct. 31 doubled those of the previous quarter. In the quarter ended July 31 Viatron's revenue was $616,000, on which it recorded a loss of $8.1 million.

It was also said unofficially at the meeting that Viatron had acquired debts senior to the debentures.

Counsel for the Old Colony Trust Co., trustee of the debentures, said the meeting was informal and unofficial, but implied that the trustee would consider the action and recommendations of the protective committee if the debentures go into default.

No one at the meeting challenged the idea that Viatron would default on the notes.

The day of the meeting the debentures were bid at 15, down from 100.

Sierra 1914B

DATA TRANSMISSION TEST SET

The Sierra 1914B is the field instrument with laboratory features — the ideal test set for complete, fast, on-site testing of data transmission systems. Designed for use in installation and maintenance testing by telephone company craftsmen, modem manufacturers, modem users, time-sharing computer companies; and many other data users.

It's versatile

- ☐ Performs static and dynamic tests of voiceband data systems.
- ☐ Tests asynchronous modems at bit rates from 150 to 2400 bps.
- ☐ Tests synchronous modems at bit rates from 10–20,000 bps.
- ☐ Checks and displays bit and block errors.
- ☐ Determines error rate margin.
- ☐ Checks sequence and delay of control signals.
- ☐ Generates three types of test messages: 1-bit sig-nal, a 63-bit word, and a 511-bit word.
- ☐ Permits in-service testing of modems.

It's compatible

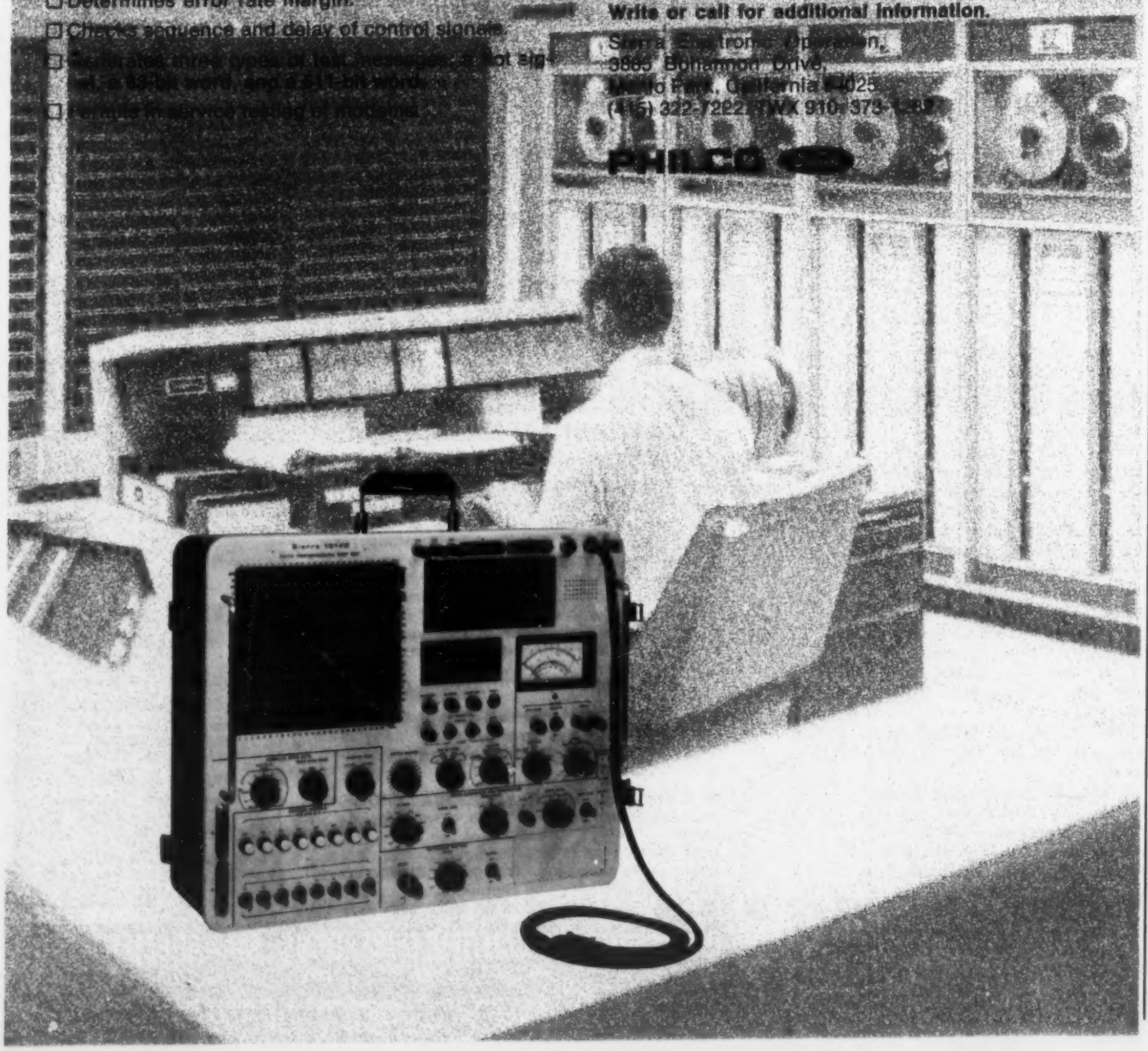
- ☐ Conforms to specification EIA-RS232B.
- ☐ Compatible with Western Electric Co. 902-903 series test sets.
- ☐ Equivalent to Western Electric Co. 914B Test Set.

It's portable

- ☐ It goes where the problem is.

Write or call for additional information.

Sierra Electronic Operation,
3885 Bohannon Drive,
Menlo Park, California 94025
(415) 322-7222 TWX 910-373-1267



Acquisitions

Richmond Power Equipment Co. has agreed in principle to merge with **Computer Age Industries, Inc.**, Fairfax, Va. The transaction would be effected through an exchange of Computer Age stock and is subject to completion of a public offering of the stock by August, and other conditions.

Computer Age is engaged in contract computer education, consulting, and investment advisory services. Richmond Power distributes lawn, garden, and golf course equipment.

Microdata Corp., a Santa Ana, Calif., based minicomputer manufacturer, has acquired **Monitor Data Corp.**, also of Santa Ana, for an exchange of stock.

Life Investors Insurance Co. of America has gained control of **Executive Data Systems, Inc.** through the purchase of common and preferred stock. EDS, which supplies DP services on a time-sharing basis to hospitals in the Midwest, also announced the termination of its merger agreement with Compucare, Inc.

Allied Management & Systems Corp. has acquired 80% interest in **Computer Methods Corp.** of White Plains, N.Y., from Coburn Corp. of America. Computer Methods operates a programming and systems consulting service. Allied Management is a technical services, production and manufacturing company.

Computing & Software, Inc., Los Angeles, has acquired **R.E. Harrington** of Columbus, Ohio, in an exchange of an undisclosed amount of C&S common stock. Harrington, which furnishes cost-control services to nationwide employers, will become a subsidiary in the Business Services Group of C&S.

Comserv Corp., Minneapolis, has acquired certain assets of **Data Central, Inc.** Comserv offers systems consulting and DP services.

Earnings Reports

AFFILIATED COMPUTER SYSTEMS INC.
Six Months Ended June 30

	1970	1969
Shr Ernd (Loss)	($1.53)	$.10
Revenue	792,577	1,100,459
Earnings (Loss)	(1,163,820)	59,983

FOXBORO CO.
Three Months Ended Sept. 30

	1970	1969
Shr Ernd	$.28	$.33
Revenue	37,839,000	30,682,000
Earnings	1,205,000	1,409,000
9 Mo Shr	.75	.69
Revenue	105,552,000	87,491,000
Earnings	3,162,000	2,933,000

ENERGY CONVERSION DEVICES
Three Months Ended Sept. 30

	1970	1969
Revenue	$147,000	$98,000
Loss	743,000	440,000

TRADE*QUOTES

Computerworld Stock Trading Summary

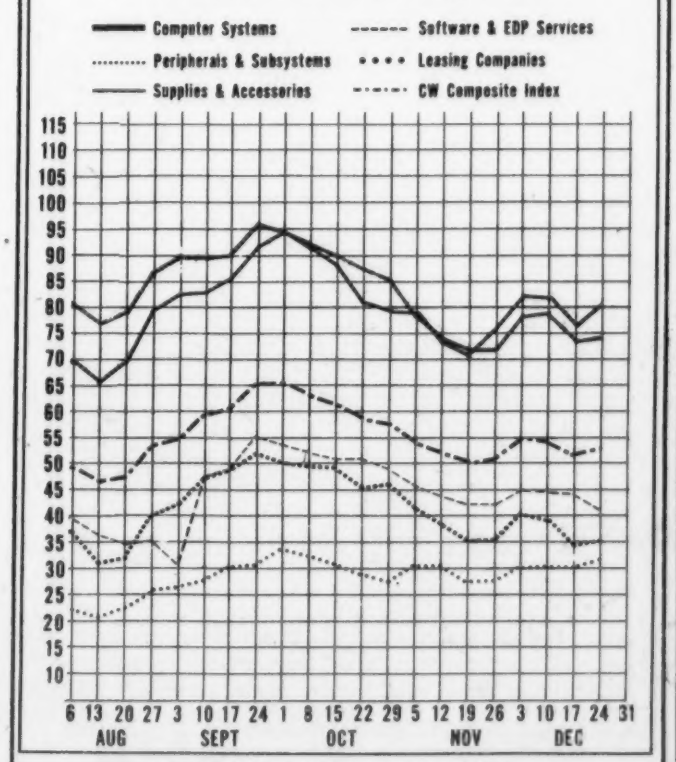
All statistics compiled, computed and formatted by TRADE★QUOTES, INC. Cambridge, Mass. 02139

CLOSING PRICES THURSDAY, DECEMBER 24, 1970

EXCH		1970 RANGE (1)	CLOSE DEC 24 1970	WEEK NET CHNGE	WEEK PCT CHNGE
	SOFTWARE & EDP SERVICES				
O	ADVANCED COMP TECH	1- 6	2 1/8	+ 1/8	+6.2
A	APPLIED DATA RES.	4- 24	4 1/2	+ 1/4	+5.8
O	APPLIED LOGIC	1- 18	1 1/8	+ 1/8	+12.5
O	ARIES	1- 8	1 3/8	- 1/8	-8.3
N	AUTOMATIC DATA PROC	23- 48	44 3/8	-2	-4.3
O	AUTO SCIENCES	3- 14	3 5/8	- 1/4	-6.4
O	BRANDON APPLIED SYS	0- 9	3/8	- 7/8	-70.0
O	COMPUTER AGE INDUS.	1- 3	1 1/4	- 1/4	-16.6
O	COMPUTER ENVIRON	1- 15	3/4	+ 1/4	+50.0
O	COMPUTER INDUS.	2- 24	4	-1	-20.0
O	COMPUTER NETWORK	2- 14	2 3/4	-2	-42.1
O	COMPUTER PROPERTY	5- 15	4 1/2	- 1/2	-10.0
N	COMPUTER SCIENCES	6- 34	9 1/2	- 1/4	-2.5
O	COMPUTER TASK GROUP	1- 4	1	0	0.0
O	COMPUTER USAGE	2- 8	5	- 1/4	-4.7
A	COMPUTING & SOFTWARE	16- 75	29 3/4	-1 1/4	-4.0
O	COMRESS	1- 10	1 3/8	- 5/8	-31.2
O	COMSHARE	2- 15	5 7/8	- 1/4	-4.0
O	CONSOL. ANAL. CENT.	1- 4	1/2	+ 1/8	+33.3
O	DATA AUTOMATION	1- 24	1 1/8	- 1/8	-10.0
O	DATA PACKAGING	5- 29	5 1/4	- 3/8	-6.6
O	DATAMATION SERVICE	1- 6	7/8	0	0.0
O	DATATAB	4- 9	3 7/8	+ 3/8	+10.7
O	DIGITEK	1- 5	1	- 1/8	-11.1
O	EDP RESOURCES	5- 13	7 1/2	- 3/4	-9.0
A	ELECT COMP PROG	3- 11	3 3/8	+ 1/4	+8.0
O	ELECTRONIC DATA SYS.	31-161	58 3/4	+2 3/4	+4.9
O	INFORMATICS	4- 21	7 3/8	+1 1/8	+18.0
A	ITEL	6- 26	15 7/8	+ 7/8	+5.8
O	LEVIN-TOWNSEND SERV.	1- 13	2 1/4	0	0.0
A	MANAGEMENT DATA	7- 25	7	- 1/4	-3.4
O	NAT COMP ANALYSTS	1- 8	2	- 1/4	-11.1
O	NAT.COMP. SERV.	2- 12	2 1/2	- 1/4	-9.0
N	PLANNING RESEARCH	13- 54	17 5/8	+1	+6.0
O	PROGRAMMING METHODS	9- 27	15	0	0.0
O	PROGRAMMING & SYS	2- 5	2	0	0.0
L	PROGRAMMING SCIENCES	1- 33	3/4	0	0.0
N	SCIENTIFIC RESOURCES	2- 22	3 3/8	+ 1/8	+3.8
O	SOFTWARE SYSTEMS	1- 3	1/8	- 1/8	-50.0
O	TBS COMPUTER CENTERS	4- 27	4 1/4	0	0.0
O	UNITED DATA CENTER	1- 4	2	0	0.0
N	UNIVERSITY COMPUTING	14- 99	21 1/2	0	0.0
A	URS SYSTEMS	5- 21	6 1/4	- 3/8	-5.6
O	U.S. TIME SHARING	1- 14	1 3/4	- 1/4	-12.5
	PERIPHERALS & SUBSYSTEMS				
N	ADDRESSOGRAPH-MULT	20- 62	25 3/8	+2 1/8	+9.1
O	ALPHANUMERIC	2- 15	3	+ 1/8	+4.3
N	AMPEX CORP	13- 48	18 1/4	+1 3/8	+8.1
O	ASTRODATA	1- 34	3/8	0	0.0
O	ATLANTIC TECHNOLOGY	2- 14	3 3/4	+ 1/2	+15.3
A	BOLT,BERANEK & NEW	3- 11	5 3/8	- 1/2	-8.5
N	BUNKER-RAMO	6- 14	10 1/4	+ 3/8	+3.7
A	CALCOMP	11- 36	26 5/8	- 1/8	-0.4
O	COGNITRONICS	3- 13	6 3/4	+ 1/4	+3.8
O	COLORADO INSTRUMENTS	5- 12	5	- 3/8	-6.9
O	COMPUTER COMMUN.	5- 36	5 1/2	-1 1/2	-21.4
A	COMPUTER EQUIPMENT	4- 12	3 3/4	0	0.0
A	COMPUTEST	12- 28	13 1/8	- 1/4	-1.8
O	CONSOL COMPUTER LTD.	4- 14	7 1/2	+1 1/4	+20.0
A	DATA PRODUCTS CORP	5- 26	6 3/8	+ 3/8	+6.2
O	DATA TECHNOLOGY	2- 23	2 1/2	- 1/4	-9.0
O	DIGITRONICS	3- 13	3 3/8	0	0.0
N	ELECTRONIC M & M	7- 40	7 7/8	+ 3/8	+5.0
O	FABRI-TEK	2- 8	2	- 1/8	-5.8
O	FARRINGTON MFG	1- 17	1	- 1/2	-33.3
O	INFORMATION DISPLAYS	4- 20	5 5/8	- 3/8	-6.2
O	MANAGEMENT ASSIST	1- 4	7/8	+ 1/4	+40.0
A	MARSHALL INDUSTRIES	14- 67	21 1/8	+1 1/8	+5.6
A	MILGO ELECTRONICS	15- 42	24 1/2	- 1/8	-0.5
N	MOHAWK DATA SCI	19- 87	25 7/8	+1 1/2	+6.1
O	OPTICAL SCANNING	11- 52	12 1/2	-1	-7.4
O	PHOTON	4- 17	7	- 1/4	-3.4
O	PHOTO-MAGNETIC SYS.	1- 9	1 1/4	0	0.0
A	POTTER INSTRUMENT	15- 42	18	+ 1/2	+2.8
O	PRECISION INST.	6- 25	6 1/2	-1 1/4	-16.1
O	RECOGNITION EQUIP	12- 83	14	-1	-6.6
O	REDCOR CORP.	4- 34	6 1/8	+ 5/8	+11.3
N	SANDERS ASSOCIATES	7- 29	11 5/8	+ 7/8	+8.1
O	SCAN DATA	5- 53	7 1/8	+ 3/8	+5.5
O	TALLY CORP.	10- 23	11 3/4	- 1/4	-2.0
N	TELEX	10- 25	16 7/8	+ 3/8	+2.2
O	VIATRON	1- 51	7/8	- 5/8	-41.6
	SUPPLIES & ACCESSORIES				
N	ADAMS-MILLIS CORP	8- 15	12 3/8	+ 3/8	+3.1
O	BALTIMORE BUS FORMS	6- 21	5 1/2	- 3/4	-10.3
A	BARRY WRIGHT	6- 25	8 5/8	- 1/8	-1.4
A	DATA DOCUMENTS	15- 35	18	+1 1/2	+9.0
N	ENNIS BUS. FORMS	9- 19	10 1/4	0	0.0
O	GRAHAM MAGNETICS	4- 11	9 1/2	- 3/8	-3.7
O	GRAPHIC CONTROLS	5- 17	5 1/2	- 1/4	-4.3
N	MEMOREX	46-166	61 3/4	+7 3/4	+14.3
N	3M COMPANY	71-114	95 1/2	-1 1/8	-1.1
O	MOORE BUS. FORMS	25- 39	36 3/4	+ 1/2	+1.3
N	NASHUA CORP	21- 43	27 1/4	+1	+3.8
O	REYNOLDS & REYNOLD	25- 48	38 1/4	+ 3/4	+2.0
O	STANDARD REGISTER	17- 30	17	+ 1/2	+3.0
N	UARCO	22- 39	24 1/2	- 1/4	-1.0
A	WABASH MAGNETICS	7- 30	7 1/4	+ 1/2	+7.4
O	WALLACE BUS FORMS	17- 41	16 3/4	- 3/4	-4.2
	COMPUTER SYSTEMS				
N	BURROUGHS CORP	78-173	108 3/4	+2 1/4	+2.1
N	COLLINS RADIO	9- 37	13 5/8	+ 5/8	+4.8
N	CONTROL DATA CORP	30-122	50 1/2	-2	-3.8
O	DATA GENERAL CORP	16- 59	20 3/8	-2 3/8	-10.4
N	DIGITAL EQUIPMENT	50-124	62 7/8	+8 1/4	+15.1
N	ELECTRONIC ASSOC.	3- 11	5 3/8	+1 1/8	+26.4
A	ELECTRONIC ENGINEER.	3- 14	5 5/8	+1 1/8	+25.0
N	FOXBORO	18- 39	24 1/4	+ 5/8	+2.6
O	GENERAL AUTOMATION	9- 42	11 1/2	0	0.0
N	GENERAL ELECTRIC	60- 92	90 3/4	- 1/2	-0.5
N	HEWLETT-PACKARD CO	19- 45	29	-1 3/4	-5.6
N	HONEYWELL INC	65-152	82	- 5/8	-0.7
N	IBM	223-387	315	+2	+0.6
N	NCR	30- 86	37 7/8	+2 3/8	+6.6
N	RCA	18- 34	26 3/4	+ 1/4	+0.9
N	RAYTHEON CO	16- 33	26 3/8	+ 5/8	+2.4
O	SCI. CONTROL CORP.	1- 8	1 1/8	- 3/8	-25.0
N	SPERRY RAND	19- 40	24 5/8	+1 1/4	+5.3
A	SYSTEMS ENG. LABS	10- 49	16 1/4	+1 1/8	+7.4
N	VARIAN ASSOCIATES	9- 29	13 1/4	+ 1/8	+0.9
A	WANG LABS.	18- 51	29 7/8	- 1/8	-0.4
N	XEROX CORP	66-115	85 7/8	+1 1/4	+1.4
	LEASING COMPANIES				
O	BOOTHE COMPUTER	8- 25	12 3/4	- 1/4	-1.9
O	BRESNAHAN COMP.	2- 9	2 1/4	- 1/8	-5.2
O	COMPUTER EXCHANGE	2- 8	4	0	0.0
A	COMPUTER INVSTRS GRP	4- 12	7	+ 1/4	+3.7
N	DATA PROC. F & G	6- 32	11 1/4	+1	+9.7
O	DATRONIC RENTAL	2- 8	2	- 1/4	-11.1
A	DEARBORN COMPUTER	10- 24	23 1/2	+2 7/8	+13.9
O	DIEBOLD COMP. LEAS.	2- 8	5	+ 7/8	+21.2
A	DPA, INC.	3- 10	3 7/8	+ 1/8	+3.3
A	GRANITE MGT	7- 22	8 1/8	+ 3/8	+4.8
A	GREYHOUND COMPUTER	5- 44	6 1/4	0	0.0
N	LEASCO DATA PROC.	7- 30	15 1/4	+2	+15.0
O	LECTRO MGT INC	2- 9	1 3/4	0	0.0
A	LEVIN-TOWNSEND CMP	3- 19	5	+ 1/4	+5.2
O	LMC DATA, INC.	1- 3	5/8	0	0.0
O	NCC INDUSTRIES	3- 8	3	- 1/4	-7.6
O	SYSTEMS CAPITAL	1- 8	2 1/2	- 1/4	-9.0
N	U.S. LEASING	3- 19	13 5/8	+ 3/8	+2.8

EXCH: N=NEW YORK EXCHANGE; A=AMERICAN EXCHANGE
L=NATIONAL EXCHANGE; O=OVER-THE-COUNTER
O-T-C PRICES ARE BID PRICES AS OF 3 P.M. OR LAST BID
(1) TO NEAREST DOLLAR

Computer Stocks Trading Index



BASE FOR EACH TRADING INDEX: 100 as of 3/1/68

Earnings Reports

INFOTRONICS CORP.
Six Months Ended Sept. 30

	1970	a1969
Shr Ernd	.....	$.05
Revenue	$3,390,504	3,218,793
Earnings (Loss)	(98,880)	46,964

a-Restated.

GRAPHIC SCIENCES, INC.
Three Months Ended Sept. 30

	1970	1969
Revenue	$2,202,024	$1,525,530
Earnings (Loss)	a9,926	(1,430,319)

a-Includes special credit of $2,200 from tax loss carryforward.

LOGICON, INC.
Six Months Ended Sept. 30

	1970	1969
Shr Ernd	$.24	$.20
Revenue	4,541,954	3,239,794
Earnings	205,576	150,408

SMC COMPUTER SERVICES, INC.
Year Ended August 31

	1970	1969
Shr Ernd (Loss)	($.04)	$.23
Revenue	236,385	127,338
Earnings (Loss)	(16,072)	17,384

GRAPHIC CONTROLS CORP.
Nine Months Ended Sept. 30

	1970	1969
Shr Ernd	$.16	$.79
Revenue	18,461,440	17,409,130
Earnings	131.16	653,987

SCAN-DATA CORP.
Three Months Ended June 30

	1970	1969
Shr Ernd (Loss)	($.59)	($.46)
Revenue	405,793	340,516
Loss	457,680	351,580
6 Mo Shr (Loss)	(1.01)	(1.06)
Revenue	1,011,042	373,140
Loss	788,579	816,835

TALLY CORP.
Three Months Ended Oct. 4

	1970	1969
Shr Ernd	$.04	.....
Revenue	3,386,000	$2,707,000
Earnings (Loss)	77,000	(369,000)
9 Mo Shr	.15	.....
Revenue	10,853,000	7,266,000
Earnings (Loss)	264,000	(1,743,000)

ENNIS BUSINESS FORMS
hree Months Ended Nov. 30

	1970	a1969
Shr Ernd	$.18	b$.25
Revenue	11,569,814	11,466,626
Earnings	465,935	594,453
c9 Mo Shr	.59	b.71
Revenue	33,498,663	31,035,571
Spec Cred Earnings	 1,444,862	e60.543 f1,739,515

a-Restated to reflect acquisitions made on a pooling of interests basis. a-Adjusted to reflect a 100% stock dividend in December 1969. c-Based on income before special credit. e-From proceeds of life insurance policy. f-Equal to 73 cents a share.

LECTRO MANAGEMENT INC.
Nine Months Ended Sept. 30

	1970	1969
Shr Ernd	$.33	$.30
Revenue	1,029,000	612,600
Earnings	142,700	105,800

On a fully diluted basis, earnings per share for the period were 28 cents per share compared with 26 cents per share for the comparable period in 1969.

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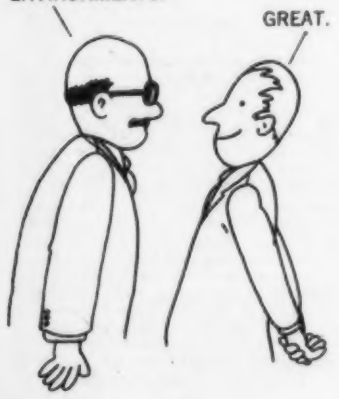

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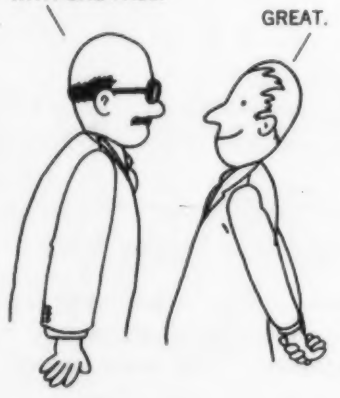

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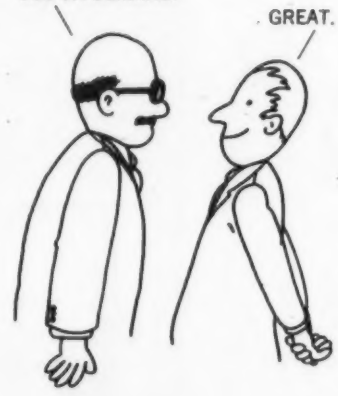

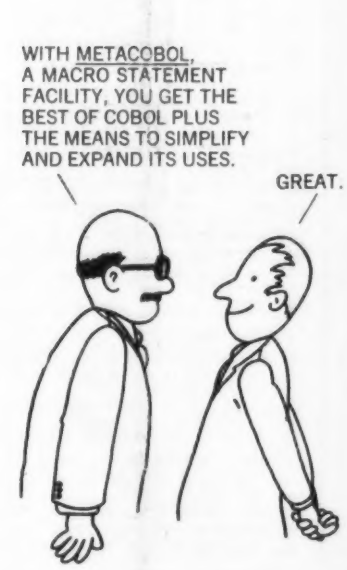

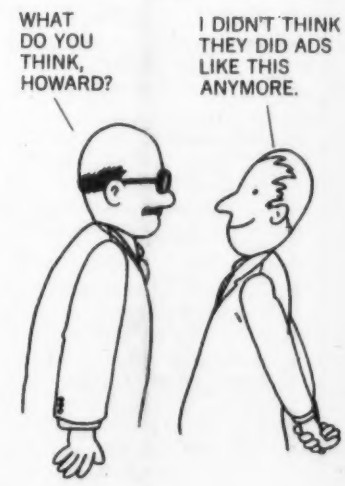

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